

EXHIBIT 4

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

Afshin Zarinebaf, Zachary Chernik,
and Joan Meyer, individually and on
behalf of a class of similarly situated
individuals,

Plaintiffs,

v.

Champion Petfoods USA, Inc. and
Champion Petfoods LP,

Defendants.

Case No. 18-cv-06951

Expert Report of Lorin M. Hitt

March 29, 2021

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I. Qualifications

1. My name is Lorin Moultrie Hitt. I am the Zhang Jindong Professor of Operations, Information and Decisions (OID) at the University of Pennsylvania, Wharton School. As a member of the Information Strategy and Economics Group (ISE), my research and teaching focus on the economics of consumer behavior, firm organization, and market structure, with particular emphasis on the role of information on pricing, performance, and competition.
2. I received my Ph.D. in Management from the Massachusetts Institute of Technology Sloan School of Management in 1996, and my Sc.B. (1988) and Sc.M. (1989) degrees in Electrical Engineering from Brown University. The majority of my Ph.D. coursework was in economics and statistics, and my doctoral dissertation was supervised in part by Zvi Griliches (Harvard), a former Chair of the American Economic Association (AEA) and a pioneer in methods for understanding the relationship between prices and quality change in complex products. I am a member of the AEA, INFORMS (Operations Research and Management Science Society), Sigma Xi (Scientific Research Society), and Tau Beta Pi (Engineering Honor Society).
3. I have taught undergraduate, masters, doctoral, and executive education level courses at the University of Pennsylvania and the Massachusetts Institute of Technology on competition and customer pricing in a variety of commercial and consumer markets, information systems management, economics of technology, and data analysis. In my Ph.D. seminar, I cover a variety of empirical methods used in economic research, including methods for estimating product demand and supply, pricing products, measuring the effect of external events on market prices, and valuing individual product features in differentiated products using techniques developed by both econometricians and marketing researchers. I am a twelve-time winner of the Wharton Undergraduate Teaching Award and have received the Wharton-wide Hauck Award and University-wide Lindback Award for distinguished teaching.
4. My research is characterized by rigorous economic analysis and I am well versed in econometric and statistical methods. A number of my published research papers focus specifically on modeling demand in consumer and commercial markets, assessing these models using market data, and using this information for pricing or product design. My research has been published in top-tier economics and management journals, including the *Quarterly Journal of Economics*, the *Review of Economics and Statistics*, the *Journal of*

Economic Perspectives, *Brookings Papers on Economic Activity*, *Management Science*, *Information Systems Research*, and other top-tier outlets.

5. I formerly served as a Department Editor at *Management Science*, and as a reviewer for a number of management and economics journals including *American Economic Review*, the *Quarterly Journal of Economics*, *Information Economics and Policy*, *Journal of Industrial Economics*, *Journal of Law, Economics, and Organization*, *Managerial and Decision Economics*, *Marketing Science*, *Review of Economics and Statistics*, and *MIT Sloan Management Review*, among others.

6. I have prior experience in litigation matters where I evaluated the value of a product or product features, including products such as cosmetics, automobiles, all-terrain vehicles, trucks, furniture, refrigerators, wet dry vacuum cleaners, and flat panel televisions as well as information technology products such as smartphones, tablets, online travel services, cloud storage services, memory devices, and personal computers. My expert opinions in these matters have been accepted in federal, state, and city courts.

7. I have specific experience in consumer class actions including the use of hedonic price analysis, conjoint analysis, contingent valuation and other types of consumer surveys, and the analysis of market price data for the purposes of class certification and measurement of economic injury. This experience includes analysis of the results of conjoint surveys for the purposes of class certification and the determination of economic injury from alleged product defects or misrepresentations. I have previously submitted expert reports in consumer class actions against Champion Petfoods with similar allegations to the instant matter.¹

8. My Curriculum Vitae is attached as **Appendix A** and a list of my testimony in the past four years is attached as **Appendix B**.

¹ Rebuttal Expert Report of Lorin M. Hitt, *Jennifer Reitman, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Central District of California Western Division, MDL Case No. 2:18-cv-01736-DOC-JPR, May 13, 2019; Second Rebuttal Expert Report of Lorin M. Hitt, *Jennifer Reitman, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Central District of California Western Division, MDL Case No. 2:18-cv-01736-DOC-JPR, September 12, 2019; Rebuttal Expert Report of Lorin M. Hitt, *Scott Weaver, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Eastern District of Wisconsin, MDL Case No. 2:18-cv-01996-JPS, September 12, 2019; Expert Report of Lorin M. Hitt, *Jennifer Song, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court District of Minnesota, MDL Case No. 18-cv-03205-PJS-KMM, December 11, 2020.

II. Summary of Allegations and Background

9. Plaintiffs allege that Champion Petfoods USA and Champion Petfoods LP (collectively “Champion”) used “misleading packaging claims and material omissions... [concerning] the quality and characteristics of their dog food diets[] and ingredients.”² Specifically, Plaintiffs allege that certain statements on Champion’s product packaging (Plaintiffs cite “Biologically Appropriate,” “Fresh Regional Ingredients,” and for products of Champion’s “Acana” brand, “Delivering Nutrients Naturally”) were misleading to consumers because, according to Plaintiffs, Champion’s products “contained and/or had a material risk of containing undisclosed and non-conforming ingredients and contaminants, such as heavy metals, a material amount of non-fresh ingredients, a material amount of non-regional ingredients, Bisphenol A (“BPA”), and pentobarbital.”³

10. Plaintiffs identify 11 specific Champion products (“At-Issue Products”), including, for example, “Orijen Original,” and “Acana Heritage Meats,” to which their allegations pertain.⁴ Plaintiffs claim that Champion “charged premium prices for the [At-Issue Products], which consumers were willing to pay based on [Champion’s] Packaging Claims and material omissions.”⁵ Plaintiffs claim that they were injured when they “were misled to pay premium prices” for the At-Issue Products because the products “did not deliver what was promised.”⁶ Plaintiffs seek to certify several classes of “[a]ll persons residing in the State of Illinois who purchased [the At-Issue Products] from June 1, 2016 to the present.”⁷

² Third Amended Class Action Complaint, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, June 17, 2020 (“Third Amended Complaint”), ¶ 1.

³ Third Amended Complaint, ¶¶ 2–3, 186. Plaintiffs cite other statements in Champion’s packaging that they describe as “misleading” (Third Amended Complaint, ¶¶ 38–40). I understand Plaintiffs do not claim any damages relating to those statements.

⁴ Plaintiffs’ Motion for Class Certification, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, February 24, 2021 (“Motion for Class Certification”).

⁵ Third Amended Complaint, ¶ 44.

⁶ Third Amended Complaint, ¶ 16.

⁷ Motion for Class Certification, pp. 1–2. Specifically, Plaintiffs have requested the Court to certify 11 classes: (1) the Acana Free-Run Poultry Class; (2) the Acana Regionals Grasslands Class; (3) the Acana Heritage Meats Class; (4) the Acana Singles Pork & Squash Class; (5) the Acana Regionals Meadowland; (6) the Acana Singles Lamb & Apple Class; (7) the Acana Singles Wild Mackerel Class; (8) the Orijen Six Fish Class; (9) the Orijen Original Class; (10) the Orijen Regional Red; and (11) the Orijen Senior Class. Because all 11 classes are defined in a similar way, I collectively refer to them as the “Class.”

11. Plaintiffs have submitted the expert report of Mr. Stefan Boedeker (the “Boedeker Report”) in support of their motion for class certification.⁸ The Boedeker Report describes Mr. Boedeker’s proposed “methodology to calculate class-wide damages if Defendants had disclosed misrepresentations and omissions at the point of purchase.”⁹ Mr. Boedeker designed and conducted four conjoint surveys to assess damages related to (1) the alleged misrepresentations on Orijen products, (2) the alleged misrepresentations on Acana products, (3) the alleged omissions on Orijen products, and (4) the alleged omissions on Acana products (the “Boedeker Surveys”). In the surveys, Mr. Boedeker presents respondents with different package labels¹⁰ in order to assess their preferences for the labels at different price points, assuming that they are purchasing a dog food product.¹¹ Mr. Boedeker relies on the results of the Boedeker Surveys, as well as his analysis of Champion sales data, to estimate damages. With his survey results, Mr. Boedeker calculates four ranges—each corresponding to one of his four surveys—of percentage reductions of the retail price that represent his estimates of the economic loss per bag of product assuming that all respective claims are included.¹² Applying these economic loss percentages to his estimates of aggregate retail sales data, he estimates damages of \$1,574,804 to \$2,403,388 for the Orijen Misrepresentations, damages of \$5,621,358 to \$6,062,007 for the Orijen Omissions, damages of \$1,217,860 to \$1,993,551 for the Acana Misrepresentations, and damages of \$4,137,188 to \$4,401,479 for the Acana Omissions.¹³

⁸ Expert Report of Stefan Boedeker, with Appendices and Supporting Materials, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, February 24, 2021.

⁹ Boedeker Report, ¶ 12.

¹⁰ For example, the labels in Mr. Boedeker’s Misrepresentation Surveys included “Fresh Regional Ingredients” and “Biologically Appropriate,” and for Acana products only, “Delivering Nutrients Naturally.” The labels in Mr. Boedeker’s Omission Surveys included “May contain measurable amounts of heavy metals such as lead, arsenic, mercury, and/or cadmium.”; and “May contain measurable amounts of BPA. BPA is a chemical compound used in plastic.” Boedeker Report, Tables 5–7.

¹¹ In the Orijen Misrepresentation Survey, Mr. Boedeker instructs respondents to “[a]ssume that you are purchasing a 13-pound bag of Orijen Regional Red dry dog food.” In the Acana Misrepresentation Survey, Mr. Boedeker instructs respondents to “[a]ssume that you are purchasing a 25-pound bag of Acana Regionals Meadowland dry dog food.” In the Omission Surveys, Mr. Boedeker instructs respondents to “[a]ssume that you are purchasing a 25-pound bag of your favorite dry dog food.” Boedeker Report, Appendix 1.

¹² The ranges are 19.1% to 29.2% for the Orijen Misrepresentations; 24.1% to 39.5% for the Acana Misrepresentations; 68.3% to 73.6% for the Orijen Omissions; and 81.9% to 87.1% for the Acana Omissions. Boedeker Report, ¶ 172 and Appendix 4.

¹³ Boedeker Report, Table 16.

III. Assignment and Materials Relied Upon

12. I was asked by counsel for Champion: (i) to evaluate whether putative Class members are similarly situated such that a common method can be used to assess economic injury, and (ii) to review and respond to the Boedeker Report on issues relating to the calculation of economic injury to the proposed Class. In particular, I was asked to evaluate whether the Boedeker conjoint survey results and the analysis presented in the Boedeker Report provide a reliable basis for calculating economic injury to the proposed Class.

13. In reaching my conclusions, I have reviewed product literature and packaging, academic research, various deposition testimony and legal filings, and various Champion internal and external documents. I have also reviewed the Boedeker Report and backup materials, the reports that Mr. Boedeker submitted on the same date in two other related matters, as well as Mr. Boedeker's deposition testimony in this and in a prior related matter. In addition, I reviewed the expert report that Professor Dominique M. Hanssens submitted on behalf of Defendants in this matter.¹⁴ **Appendix C** lists the materials I have relied upon in forming my opinions in this matter.

14. I am being compensated at a rate of \$875 per hour. I am being assisted in this matter by staff at Cornerstone Research who are working at my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent on the content of my opinion or the outcome of this or any other matter.

15. My work in this matter is ongoing and I reserve the right to update my opinions as additional information becomes available.

IV. Summary of Opinions

16. Mr. Boedeker's methodology does not and cannot measure economic loss under Plaintiffs' theory of harm. Under Plaintiffs' theory of harm, which holds that putative Class members overpaid for the At-Issue Products due to certain alleged misrepresentations and omissions on the packaging, damages should be measured by the difference between the

¹⁴ Expert Report of Dominique M. Hanssens, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, March 29, 2021 ("Hanssens Report").

market prices paid for the At-Issue Products in the real world and the *market prices* that would have prevailed for the At-Issue Products in the but-for world in which the challenged conduct is removed. Because Mr. Boedeker's estimates of percent economic loss ignore supply-side factors that affect market prices, they are based on consumers' willingness to pay and not on market price. Willingness to pay is a demand-side factor; as such, it does not itself determine market prices in the actual world and similarly cannot be relied upon, by itself, to model market prices in the hypothetical but-for world. Moreover, the use of a willingness-to-pay measure by Mr. Boedeker likely leads to an overestimate of damages even if willingness to pay were correctly measured—which it is not.

17. Even setting aside the fact that it ignores supply-side factors, Mr. Boedeker's proposed damages methodology does not yield the measure of economic loss he proposed to calculate because it does not reliably estimate demand. Mr. Boedeker's "market simulations" do not model demand for the At-Issue Products in the actual and but-for worlds, but rather simply generate estimates of purported market share for various combinations of labels in his survey (e.g., "Biologically Appropriate" and "Nourish as Nature Intended"). In addition, though Mr. Boedeker claims that he fixes the quantity supplied in the but-for world to be the same as in the actual world, nothing in his methodology to estimate the percent economic loss considers the quantity supplied or market share of the At-Issue Products in the actual world.

18. Mr. Boedeker fails to estimate properly any change in the demand curve for the At-Issue Products because he ignores the substantial heterogeneity across the respondents of his surveys. Mr. Boedeker's estimates of economic loss are based on an average of the preferences of his survey respondents. There is no guarantee that such an average would be informative in any way of the demand curve of that group of consumers. Moreover, when information about the preferences of individual respondents is considered, Mr. Boedeker's methodology generates estimates of economic loss that are either zero or much lower than the ones he presents in his report.

19. Mr. Boedeker presents estimates of his lower and upper bounds for his damages estimates, but these figures are incorrect and misleading. Despite Mr. Boedeker's claim that his methodology provides "95% confidence intervals" for his estimates of percent economic loss, his lower and upper bounds provide no such degree of statistical confidence because they ignore multiple sources of error, including error stemming from the fact that his "demand curve" regressions involve combinations of labels that do not exist in his actual or but-for worlds.

20. Mr. Boedeker's comparison of his estimated but-for prices to the prices of Pedigree brand products as a "check" is inappropriate because he has not even attempted to establish that the At-Issue Products and Pedigree products are identical, or at least good substitutes for Champion products apart from the alleged misrepresentations and omissions. Mr. Boedeker has also not established that consumers who buy Champion products would consider Pedigree products as acceptable substitutes for Champion products. Champion and Pedigree products are not comparable based on the attributes they offer, such as their ingredients, their nutritional profile, the retail channels in which they sell, or the type of consumers that purchase each brand.

21. There is no basis to assume a common impact of the challenged conduct on the putative Class members because the At-Issue Products are differentiated; therefore, changes in product characteristics will not affect the prices of all products in the same way. Heterogeneity in preferences and information in the market for the At-Issue Products indicates that the economic factors affecting demand as well as supply differ across products, consumers, and time. Evidence of this heterogeneity, and of variations in prices across vendors even for the same product, is inconsistent with the single common market that Mr. Boedeker assumes.

22. A reliable assessment of damages to the putative Class members is likely to require individualized inquiry. Mr. Boedeker's estimates are not based on the actual prices paid by the putative Class members. Instead, Mr. Boedeker relies on a flawed estimate of retail prices based on wholesale prices and an assumed profit margin identical for all retailers in the industry, which ignores that retail prices depend on multiple factors that can vary from individual to individual (such as specific retailer pricing decisions like sales and discounts, or coupons), across vendors, and over time. The profit margin applicable to Champion products may be very different from Mr. Boedeker's assumption. Mr. Boedeker cannot confirm his assumption because he has not analyzed any aspect of Champion's cost structure, or the cost structure of Champion's retailers. In addition, Mr. Boedeker's analysis ignores that the sources of information that consumers have available at the time of purchase are varied, and potentially very different from the information provided uniformly to respondents in the Boedeker Surveys, which would cause their behavior in Mr. Boedeker's surveys to differ from their behavior in an actual retail setting.

V. Mr. Boedeker’s “Economic Loss” Analysis Does Not Measure Plaintiffs’ Alleged Economic Injury Based on a Market Price Premium Theory of Damages Because It Ignores Supply-Side Factors

A. Background on Mr. Boedeker’s Surveys and Associated Analysis of “Economic Loss”

23. Mr. Boedeker states that his assignment was to “explain and outline an economic model that enables the quantification of economic losses suffered by Plaintiffs and the Class, as a result of having purchased a product that is other than as represented by Defendants.”¹⁵ His proposed methodology includes three main steps.

24. First, Mr. Boedeker conducted four conjoint surveys of consumers. Mr. Boedeker calls his surveys the “Orijen Misrepresentation Survey,” the “Acana Misrepresentation Survey,” the “Orijen Omission Survey,” and the “Acana Omission Survey.”¹⁶ For the Orijen and Acana Misrepresentation Surveys, “respondents were introduced to a hypothetical purchase situation where they [were] told to assume that they [were] purchasing” one of the At-Issue Products.¹⁷ Specifically, in the Orijen Misrepresentation Survey Mr. Boedeker instructed respondents to assume they will buy a 13-pound bag of Orijen Regional Red dry dog food,¹⁸ and in the Acana Misrepresentation Survey he instructed respondents to assume they will buy a 25-pound bag of Acana Regionals Meadowland dry dog food.¹⁹ Mr. Boedeker presented respondents of his Orijen and Acana Misrepresentation Surveys with images of these specific Orijen and Acana product packages, respectively.²⁰ For the Orijen and Acana Omission Surveys, Mr. Boedeker presented respondents with a “hypothetical purchase situation where they [were] told to assume that they [were] purchasing a bag of their favorite dog food.”²¹ Mr. Boedeker then had respondents complete choice tasks in which they were asked to select their preferred set of labels that may be on the bag of dog food at a given price, and then indicate if they would purchase the option they selected.²² In the Orijen and Acana Misrepresentation Surveys, Mr. Boedeker used labels corresponding to what

¹⁵ Boedeker Report, ¶ 12.

¹⁶ Boedeker Report, ¶ 102.

¹⁷ Boedeker Report, ¶¶ 129, 133.

¹⁸ Boedeker Report, ¶ 129.

¹⁹ Boedeker Report, ¶ 133.

²⁰ Boedeker Report, ¶¶ 130, 134.

²¹ Boedeker Report, ¶ 137.

²² Boedeker Report, Figures 5, 7–9, Tables 8–10.

Plaintiffs claim are misrepresentations on the packaging of the At-Issue Products, in addition to “decoy” labels.²³ In the Orijen and Acana Omission Surveys, he used labels corresponding to what Plaintiffs claim are omissions from the At-Issue Products’ packaging (i.e., the alleged “corrective statements”), in addition to a “distractor” label.²⁴ The wording of the labels used in the Orijen and Acana Omission Surveys was provided to Mr. Boedeker by counsel for Plaintiffs.²⁵

25. In his second step, Mr. Boedeker relied on the responses to his surveys to create estimates “of damages per bag of Defendant’s dog food.”²⁶ Specifically, Mr. Boedeker claims that he analyzed the responses to his surveys to test how the alleged misrepresentations and omissions in the Boedeker Surveys would shift his estimates of the demand curves for the products in his surveys.²⁷ To do this, Mr. Boedeker analyzed data from his surveys using conjoint survey analysis software to generate estimates of individual measures of preference for the labels in his survey (called “part-worths”).²⁸ Mr. Boedeker then processed these part-worths using his own computer programs and methods to estimate what he refers to as demand curves for products with different combinations of the labels relating to the alleged misrepresentations or omissions.²⁹ For each of the surveys, Mr. Boedeker then calculated a range of estimates for the percent difference between his so-called demand curves in the actual world and in the but-for world (where the products excluded one or more of the alleged misrepresentations or had one or more corrective statements).³⁰ In his Appendix 4, Mr. Boedeker presents a “point estimate,” a lower bound, and upper bound for

²³ The “misrepresentation” labels used in Mr. Boedeker’s surveys are “Biologically Appropriate,” “Fresh Regional Ingredients,” and “Delivering Nutrients Naturally” (for Acana products only). In addition, Mr. Boedeker selected the decoy labels “WholePrey Diet” and “Low Temperature” and “Nourish as Nature Intended” for the Orijen product, and the decoy labels “WholePrey Diet” and “High Palatability” for the Acana product. Boedeker Report, ¶¶ 116–117, Tables 5–6.

²⁴ The “omissions” labels used in Mr. Boedeker’s surveys are: “May contain measurable amounts of heavy metals such as lead, arsenic, mercury, and/or cadmium.”; “May contain measurable amounts of BPA. BPA is a chemical compound used in plastic.”; “May contain expired ingredients. Expired ingredients are ingredients that have passed their ‘shelf life’ date.”; and “May contain regrinds. Regrinds are previously made dry dog food that is ground and then used in another batch of dry dog food.” In addition, Mr. Boedeker included as a “distractor” label “May contain artificial preservatives. Artificial preservatives are added to food to fight spoilage caused by bacteria, molds, fungus, and yeast.” Boedeker Report, ¶¶ 121–122, Table 7.

²⁵ Boedeker Report, ¶ 124.

²⁶ Boedeker Report, ¶ 14.

²⁷ Boedeker Report, ¶ 59.

²⁸ Boedeker Report, ¶ 74.

²⁹ Boedeker Report, ¶ 85.

³⁰ Section VI provides a detailed explanation of Mr. Boedeker’s estimation of percent economic loss.

the percentage economic loss for each of the different alleged misrepresentations and combinations of those misrepresentations, and for each of the different alleged omissions and combinations of those omissions.³¹ Mr. Boedeker does not present estimates of economic loss for any combination of omissions and misrepresentations jointly.

26. In his last step, Mr. Boedeker relies on his estimates of economic loss per bag and on Champion's sales data to estimate four ranges of class-wide damages. Mr. Boedeker first generates estimates of Champion's revenue by brand (Acana or Orijen) in the U.S. by aggregating wholesale sales data produced by Champion for the At-Issue Products covering the period from June 1, 2016 to December 2018.³² Mr. Boedeker then assumes a retailer markup of 40% to estimate retail sales.³³ To estimate sales of the At-Issue Products to the proposed Class, Mr. Boedeker multiplies his estimate of U.S. retail sales of At-Issue Products by an estimate of Illinois' share of U.S. dog ownership.³⁴ Finally, Mr. Boedeker generates an estimate of the lower bound, median, and upper bound of damages to the proposed Class by multiplying his estimate of sales of Acana and Orijen At-Issue Products to the proposed Class by the corresponding estimated lower bound, median, and upper bound of the percentage economic loss per bag of product assuming that all respective claims were included.³⁵ Mr. Boedeker presents his estimates of damages in Table 16 of his report.

B. Mr. Boedeker's Surveys and "Economic Loss" Analysis Cannot Yield Estimates of Market Prices and Therefore Cannot Be Used to Calculate Overpayment Damages Claimed by Plaintiffs

27. Plaintiffs claim that "[a]s a result of [the] false or misleading statements and omissions, consumers, like Plaintiffs, suffered financial losses by overpaying premium prices for the [At-Issue Products] that did not conform to their packaging claims."³⁶ Based on this theory of harm, damages should be measured by the difference between the *market prices* paid for the At-Issue Products in the real world and the *market prices* that would have prevailed for the At-Issue Products in the but-for world in which the challenged conduct is

³¹ Boedeker Report, Table 14, Appendix 4.

³² Boedeker Report, ¶ 18.

³³ Boedeker Report, ¶ 20.

³⁴ Boedeker Report, ¶ 21.

³⁵ Boedeker Report, ¶ 172, Table 16.

³⁶ Third Amended Complaint, ¶ 193.

removed.³⁷ Thus, Mr. Boedeker needs to provide a methodology that can estimate market prices in the but-for world as well as the actual world.

28. Market prices are determined by both supply and demand.³⁸ Determining demand requires, at a minimum, determining consumers' "willingness to pay" for a product ("WTP") which represents "the maximum amount that a buyer will pay for a good."³⁹ Different consumers are likely to have different WTP for the same product. This is because, in general, consumers are differently situated and have different preferences and different information, among other characteristics.⁴⁰ For the same reasons, the potential change in the WTP caused by the change in a product attribute is likely to be different for different consumers.⁴¹ Individual consumer WTP can be used to derive the demand curve for a product in that market.⁴²

29. Determining supply requires, at a minimum, identifying the cost structure and other characteristics of producers and retailers to determine their "willingness to sell."⁴³ The willingness to sell of producers and retailers depends on their costs, including not just the cost of producing or sourcing a product, but "the value of everything a seller must give up to produce [or retail] a good."⁴⁴ The willingness to sell of all potential sellers in a market can be used to derive the supply curve of a product in that market.⁴⁵

³⁷ Other statements by Plaintiffs further support the interpretation that Plaintiffs claim as damages the difference between the price they paid and the price they would have paid but-for the allegations. For example, Plaintiffs allege that "Defendants' misrepresentations, concealment, omissions, and other deceptive conduct were likely to cause consumers to purchase and/or overpay for the [At-Issue Products]" (Third Amended Complaint, ¶ 230). Plaintiffs also allege that "Defendants' misrepresentations, concealment, omissions, and other deceptive conduct did in fact deceive and cause Plaintiff and the Class Members to purchase and/or overpay for the [At-Issue Products]" (Third Amended Complaint, ¶ 235).

³⁸ See, e.g., N. Gregory Mankiw, *Principles of Microeconomics*, 5th edition (Mason, OH: South-Western Cengage Learning, 2008) ("Mankiw (2008)"), p. 65. ("Supply and demand are the forces that make market economies work. They determine the quantity of each good produced and the price at which it is sold.")

³⁹ Mankiw (2008), p. 138.

⁴⁰ Mankiw (2008), pp. 457–461, 483–484; Wagner A. Kamakura, Byung-Do Kim, and Jonathan Lee, "Modelling Preference and Structural Heterogeneity in Consumer Choice," *Marketing Science* 15, no. 2 (May 1996): 152–172 at 153 ("Consumer heterogeneity is one of the most fundamental concepts in marketing strategy and planning.")

⁴¹ For this reason, measurements of alleged damages based on WTP will not be common across putative Class members and will require individualized inquiry.

⁴² See, e.g., Mankiw (2008), p. 139.

⁴³ See, e.g., Hal R. Varian, *Microeconomic Analysis*, 3rd edition (New York, NY: W. W. Norton & Company, 1992), pp. 215–232; Mankiw (2008), pp. 143–146.

⁴⁴ Mankiw (2008), p. 143.

⁴⁵ See, e.g., Mankiw (2008), pp. 143–144.

30. Critically, the market equilibrium price of a product is determined by the *interaction* of supply and demand.⁴⁶ The same is true of the market equilibrium quantity. Prices and quantities in the actual world reflect the intersection of supply and demand—they do not fully describe supply or demand by themselves.

31. Mr. Boedeker states that his calculation of damages is based on the “willingness-to-pay of the marginal consumer who determines the market equilibrium in the actual world.”⁴⁷ However, even if Mr. Boedeker could estimate the willingness to pay of the marginal consumer in the actual world with his methodology (which he cannot, as I explain in Section VI), the willingness to pay of the marginal consumer in the *actual world* does not determine the market price in the *but-for world*. This is because the marginal consumer in the actual world will likely be different from the marginal consumer who determines the market equilibrium in the but-for world. To identify the marginal consumer in the but-for world (and measure the alleged economic loss), Mr. Boedeker needs to propose a method that (1) can model both supply and demand in the relevant market and (2) can account for the profit-maximizing choices of Champion as well as other competitors that participate in the market. Mr. Boedeker has not done so.

32. One reason Mr. Boedeker’s methodology does not yield but-for market prices is because his analysis ignores supply-side factors. Mr. Boedeker’s results are solely based on the Boedeker Surveys, which collect information from a sample of consumers who can only provide information about their preferences—the demand side of the market. None of the steps in Mr. Boedeker’s analysis involves analyzing supply-side factors such as the characteristics of Champion’s cost structure, the cost structure of Champion’s competitors, or the competitive interactions among Champion and other dog food producers.⁴⁸ Mr. Boedeker

⁴⁶ Mr. Boedeker has acknowledged this economic principle in deposition. See Deposition of Stefan Boedeker, Jennifer Song, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP, United States District Court District of Minnesota, MDL Case No. 18-cv-03205-PJS-KMM, December 2, 2020 (“Boedeker Song Deposition”), p. 73:17–21 (“[D]o you agree with me in the real world, market prices are determined by both supply factors and demand factors? A. That -- that is -- yeah. That's the definition of how market prices are determined”). See also Walter Nicholson, *Microeconomic Theory: Basic Principles and Extensions*, 7th edition (Orlando, FL: The Dryden Press, 1998), p. 11. (“... just as you cannot tell which blade of a scissors does the cutting, so too you cannot say that either demand or supply alone determines price.”).

⁴⁷ Boedeker Report, ¶ 43.

⁴⁸ See, e.g., Deposition of Stefan Boedeker, Rachel Colangelo, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP, United States District Court Northern District of New York, Case No. 6:18-cv-01228, March 16, 2021 (“Boedeker Colangelo Deposition”), pp. 70:18–71:7 (“[I]n an earlier deposition we talked about you had not done any analysis of Champions’ costs for the ingredients, for example, that went into its food. I take it that’s also still true? A. That is correct. I did not analyze the cost structure of the products at issue here.”).

acknowledges the fact that his analysis does not incorporate supply side considerations when he (incorrectly) states that “[t]he shape of the supply curve(s) in the Actual-World and in the But-For-World is irrelevant for the quantification of economic damages.”⁴⁹

33. The but-for world in Mr. Boedeker’s proposed analysis does not consider Champion’s willingness to supply (e.g., Champion’s cost structure, its ability to expand or contract production, and the availability of its production inputs) or Champion’s decisions regarding changes to product packaging, promotional strategy, advertising; seeking independent evaluations or endorsements; or other strategies that would enable Champion to most profitably sell its products.⁵⁰

34. Furthermore, it is not possible to predict the price response to a change in demand in a competitive market without a complete characterization of supply and demand for *all* participants (i.e., dog food manufacturers including Champion). Mr. Boedeker does not analyze competitors at all and incorrectly depicts Champion as a monopoly that in essence sells only two products.⁵¹ In the but-for world, Champion competitors could react in a variety of ways, including by changing the price and availability of substitute products.⁵² But

Q. Okay. And have you yet conducted any analysis of the costs of Champion’s competitors? A. No. I have not done any competitor analysis either. Q. Okay. Have you done any analysis of Champions’ production capabilities, ability to scale up, scale down? A. I have not”). *See also* Boedeker Song Deposition, p. 63:15–19 (“Q. Okay. As part of your engagement here, have you reviewed any information to inform yourself about Champion’s cost of goods sold? A. I did not do a cost-of-goods-sold analysis for the Champions product”). I understand that the testimony given in the Boedeker Colangelo Deposition applies to this case. *See* Boedeker Colangelo Deposition, pp. 7:22–8:4.

⁴⁹ Boedeker Report, ¶ 51.

⁵⁰ *See, e.g.*, Mankiw (2008), pp. 73–76, 143–144; Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, “Valuation of Patented Product Features,” *The Journal of Law and Economics* 57, no. 3 (August 2014): 629–663 at 630 (“However, a conjoint survey, in and of itself, is not adequate to form the basis for equilibrium firm profit calculations. Not only must we calibrate demand for products, but we must also compute industry equilibria. This requires measures of costs, a demand system not only for the focal product but also for the major competing products, and an equilibrium concept.”).

⁵¹ Mr. Boedeker makes only two references to competitors in his report. The first is when he defines his “economic framework.” He explains that his derivation considers Champion’s “residual demand,” which he defines as “the individual producer’s demand curve, which is that portion of market demand that is not supplied by other producers in the market.” Boedeker Report, footnote 16. Second, he references competitors when describing his methodology in selecting survey respondents in choosing only “[r]espondents [who] have purchased dog food from at least one premium dog food brand in the past 3 years.” Boedeker Report, ¶¶ 108, 175; footnotes 46, 88. Mr. Boedeker’s economic framework does not account for the potential reaction of competitors in the but-for world, and assumes that they are static. This amounts to assuming that Champion is a monopoly. Moreover, Mr. Boedeker’s quantitative analysis does not consider competitors. His conjoint survey does not present respondents with the alternative products from producers other than Champion that would be available to them in the actual world. *See* Boedeker Report, Section 5. Similarly, his simulations do not consider the existence of competing products when he calculates the “market shares” or the so-called demand curves for the products in his analysis. *See* Boedeker production materials.

⁵² Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, “Valuation of Patented Product Features,” *The Journal of Law and Economics* 57, no. 3 (August 2014): 629–663 at 630. To the extent that Mr. Boedeker’s

Mr. Boedeker does not consider competitors' product lineup, their cost structures, their ability to change prices, or any non-price reactions.⁵³ In fact, competing products simply do not exist in Mr. Boedeker's but-for world.

35. Champion does not distribute its products directly to consumers, but instead uses a network of independent retailers to distribute its products to consumers.⁵⁴ Thus, any economic loss analysis for buyers of the At-Issue Products needs to account for reactions of not just the manufacturers (Champion and its competitors) but also the retailers who ultimately set the prices that consumers pay. Mr. Boedeker did not study the supply chain of Champion's products,⁵⁵ and his proposed analysis does not account for retailer price discounts, bulk or bundled pricing, or retailer loyalty programs.⁵⁶ He also does not account for retailers' reactions to Champion's promotional activity (e.g., volume discounts and free products that may affect the way that retailers market Champion's products, and prices that consumers pay).⁵⁷ In Mr. Boedeker's analysis, retailers play no role beyond setting a markup

hypothesized reaction is restricted to changing product prices rather than the full range of strategies Champion could pursue, even if such price changes could be correctly calculated, it would overstate damages. This is because Champion could only gain more profit from having more flexibility to use non-price strategies when responding; it would never earn less profit because Champion could always ignore this flexibility and simply change price if that were optimal.

⁵³ See, e.g., Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, "Using Conjoint Analysis to Determine the Market Value of Product Features," *Proceedings of the Sawtooth Software Conference* (October 2013): 341–355 at 342 ("To compute equilibrium outcomes, we will have to make assumptions about cost and the nature of competition and the set of competitive offers. Conjoint studies will have to be designed with this in mind. In particular, greater care to include an appropriate set of competitive brands, handle the outside option appropriately, and estimate price sensitivity precisely must be exercised.").

⁵⁴ I understand that Champion sells products to wholesalers, who then sell to independent retailers, who are free to set their own prices. See, e.g., "Where to Buy," *Acana*, https://acana.com/en_US/where-to-buy; "Where to Buy," *Orijen*, https://orijen.ca/en_US/where-to-buy.

⁵⁵ Boedeker Colangelo Deposition, p. 71:8–15 ("Q. Okay. Have you looked at any aspect of Champions' supply chain since the last time I took your deposition? A. I have not. Q. Okay. Done any analysis of whether Champion relies on wholesalers? A. I have not done a separate analysis of that either"). See also Boedeker Song Deposition, p. 102:17–21 ("I did not research that, so I don't know if there's somebody before the retailers or just Champions. I don't know. I haven't studied the supply chain of Champions.").

⁵⁶ Boedeker Colangelo Deposition, p. 72:13–18 ("Q. Okay. Have you looked at any strategies individual retailers might use in order to spur sales of Champion Pet Foods? In-store discounts, two for ones, anything like that? A. I haven't analyzed any – any marketing activities on the retailer side"). Retailers could also affect the quantities of the products sold by changing their inventory management, or reducing spoilage. Mr. Boedeker does not consider any of these factors.

⁵⁷ See, e.g., Boedeker Colangelo Deposition, pp. 71:21–72:8 ("Q. And since the last time I took your deposition have you done any analysis of whether Champion's pricing includes store discounts or customer loyalty or bundled pricing, anything of that nature? A. I have not analyzed that pricing structure separately, no, I have not. Q. Okay. Since the last time I took your deposition have you done anything to look at any impact of return terms, the ability of retailers to return products or how that may impact on what pricing they get from Champion? A. I have not analyzed the impact of returns on prices or costs."). See also Boedeker Song Deposition, p. 62:10–16 ("Have you seen any instances or done anything to inform yourself how often pet retailers might try to negotiate a more favorable product return term? A. You mean with -- with the manufacturer? Q. Yes. A. No. No, I have not").

on Champion's estimated wholesale price that allows them a gross profit margin of 40%, which is identical for all consumers and products, and constant over time.⁵⁸

36. In summary, Mr. Boedeker has not offered a method that can sufficiently approximate supply and demand in the markets for At-Issue Products. Due to its inability to account for a variety of factors that impact market prices on both the demand and the supply side, Mr. Boedeker's proposed method cannot estimate market prices.

C. Mr. Boedeker's Claim that the Supplied Volume in the But-For World Cannot Deviate from the Supplied Volume in the Actual World Is Incorrect

37. Mr. Boedeker asserts that "there is no need for information on the cost structure of the manufacturer or the shape of its supply function" when calculating damages.⁵⁹ His reasoning for this assertion is based on his interpretation of the *Reference Guide on Scientific Evidence*.⁶⁰ According to Mr. Boedeker, the framework in the *Reference Guide* postulates that he should "not consider changes to the supply in the But-For World and that [he should] consider that the supplied volume is the same in the But-For-World as in the Actual-World."⁶¹ Mr. Boedeker's interpretation of the *Reference Guide* is incorrect and leads to an estimate of damages that is not based on market prices.

38. Mr. Boedeker's interpretation of the *Reference Guide* ignores that there are two components to the calculation of market price-based damages. One is the calculation of the number of units eligible for damages, and the other is the calculation of the per-unit "price premium" (the difference between actual and but-for market prices). While Plaintiffs may argue that per-unit damages must be applied to all of the units of At-Issue Products sold in the actual world, it is incorrect to interpret the *Reference Guide* to mean that the but-for price must be determined under the constraint that the number of units sold in the but-for world (i.e., the but-for quantity) matches the number of units sold in the actual world (i.e., actual quantity).⁶²

⁵⁸ Boedeker Report, ¶ 20, Table 16.

⁵⁹ Boedeker Report, ¶ 37.

⁶⁰ Boedeker Report, ¶ 25, citing Mark Allen, Robert E. Hall, and Victoria A. Lazear, "Reference Guide on Estimation of Economic Damages," in *Reference Manual on Scientific Evidence*, 3rd edition (Washington, DC: The National Academies Press, 2011) ("*Reference Guide*"), p. 432.

⁶¹ Boedeker Report, ¶ 40.

⁶² Nowhere in the *Reference Guide* does it state that the but-for price must be determined under the constraint that the number of units sold in the but-for world matches the number of units sold in the actual world.

39. The *Reference Guide* notes that the analysis of damages “considers the difference between the plaintiff’s economic position if the harmful event had not occurred and the plaintiff’s actual economic position.”⁶³ The assessment of the economic position of Plaintiffs means modeling, in the hypothetical but-for world, how consumers *and suppliers* would respond to the correction of the harmful act and, ultimately, how the market price of the At-Issue products would change going from the actual world to the but-for world.⁶⁴

40. According to Mr. Boedeker, the but-for world is “the hypothetical world, where the purchasers of Defendants’ dog food products had been informed at the time and place of purchase that the packaging of the products contained misrepresentations and omissions.”⁶⁵ Contrary to the guidance from the *Reference Guide*, he restricts the characterization of the but-for world solely to the type of information consumers have about the At-Issue Products and the resulting change in consumer preferences. While Mr. Boedeker is apparently comfortable measuring and accounting for the changes in consumer preferences and actions that stem directly from the correction of the harmful act in the but-for world, he maintains that measuring and incorporating any actions on the part of suppliers that stem directly from the correction of the harmful act would not be appropriate. He acknowledges that such actions by suppliers are possible, stating that, even if in the but-for world a manufacturer would find it optimal to sell a different volume, “setting new profit-maximizing prices and volumes sold would contradict the postulate of the [*Reference Guide*] that the But-For-World should only correct for the harmful act.”⁶⁶

41. Basic microeconomic theory describes market outcomes, such as market prices, as the result of both producers and consumers taking actions to maximize their economic value.⁶⁷ Thus, allowing suppliers to react to the correction of the harmful act in the but-for world is not only a part of the framework of the *Reference Guide*—assessing the “economic position”⁶⁸—but it is required to arrive at a reliable but-for market price of the At-Issue

⁶³ *Reference Guide*, p. 432.

⁶⁴ Mr. Boedeker acknowledges in his deposition that if a manufacturer sees a change in demand for its product it may change its behavior by changing the price and the supply of the product. See Boedeker Song Deposition, p. 75:1–9 (“If a manufacturer sees a decline in demand for its product in year 2016 compared to 2015, it might change its behavior, mightn't it? A. It might change its behavior, which one way to change the behavior is change the price. Q. And another way would be to cut back on the production? A. That could -- that could also lower the supply. That's correct”).

⁶⁵ Boedeker Report, ¶ 26.

⁶⁶ Boedeker Report, ¶ 37.

⁶⁷ See, e.g., Mankiw (2008), p. 77.

⁶⁸ *Reference Guide*, p. 432.

Products. Again, market prices are determined by both demand and supply. Once a proper but-for world is constructed and the but-for market price has been reliably modeled incorporating both demand and supply factors, then the difference in market prices in the actual and but-for worlds—the per-unit damages—can be applied to the quantity of At-Issue products sold in the actual world. By refusing to allow suppliers to react in his but-for world, for example by reducing the quantity supplied, Mr. Boedeker’s resulting price calculations do not represent market prices in the but-for world and therefore cannot be used to determine any consumer overpayment, which is the difference in market prices between the actual and but-for worlds.

D. Mr. Boedeker’s Model Generates Inflated Economic Loss Estimates

42. Mr. Boedeker’s survey, at best, can provide information about consumers’ willingness to pay (WTP). It is well understood that WTP is *not* equivalent to the price offered or paid to purchase a good.⁶⁹ Mr. Boedeker’s calculation of damages, which he claims is based on the “willingness-to-pay of the marginal consumer who determines the market equilibrium in the actual world,”⁷⁰ not only fails at measuring the damages alleged by Plaintiffs, but also leads to inflated estimates of economic loss.

43. Academic researchers warn that estimates based on WTP measures may overestimate the change in market price as a result of a change in one of the product characteristics:

In many cases, WTP will overstate the price premium afforded by feature enhancement...⁷¹

The problem with both the WTP and [willingness to buy] measures is that they are not equilibrium outcomes. WTP measures only a shift in the demand curve and not what the change in equilibrium price will be as the feature is added or enhanced. [...] Standard WTP measures are shown to greatly overstate the value of the product feature.⁷²

⁶⁹ Mankiw (2008), p. 138.

⁷⁰ Boedeker Report, ¶ 43.

⁷¹ See Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, “Valuation of Patented Product Features,” *The Journal of Law and Economics* 57, 3, 629–663, p. 649.

⁷² Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, “Using Conjoint Analysis to Determine the Market Value of Product Features,” in *Proceedings of the Sawtooth Software Conference*, 341–355, p. 342.

44. WTP will generally overestimate the change in price, if any, due to the alleged omissions and misrepresentations because it does not consider the reaction of suppliers. When faced with a downward shift in demand, suppliers, at a minimum, have incentives to reduce the volume offered to offset the potential change in price, as Mr. Boedeker recognized in his report.⁷³ Because a reduction in volume offered causes equilibrium market prices to rise, the net change in market prices will be, in general, smaller than the decline in WTP.

45. Mr. Boedeker describes the example of a producer with a horizontal supply curve to argue that an approach that considers supply-side factors and allows the equilibrium sales volume to decrease in the but-for world would “not provide restitution to all Class members.”⁷⁴ Mr. Boedeker’s conclusion is incorrect. In Mr. Boedeker’s example, putative Class members would not have suffered any damages because the market price in the but-for world would be identical to the market price actually paid by consumers. This result is fully consistent with the principles of economics and would yield an appropriate estimate of damages in Mr. Boedeker’s hypothetical—i.e., zero damages. Mr. Boedeker’s example highlights the importance of taking into consideration supply-side factors. By focusing only on the demand side of the market, it is impossible for Mr. Boedeker to estimate the impact, if any, of the alleged conduct on the *market price* of the At-Issue Products.

VI. Mr. Boedeker’s Estimates of Percent Economic Loss Purportedly Based on Changes in Demand Are Critically Flawed, and His Lower and Upper Bounds for These Estimates Are Unreliable and Misleading

46. Mr. Boedeker claims that, to calculate damages in this case “it is necessary to find the price point on the But-For World’s demand curve that ensures that the same number of units that were sold in the Actual World would also be sold in the But-For World.”⁷⁵ Again, he also claims that in his approach, “only the willingness-to-pay of the marginal consumer who determines the market equilibrium in the actual world enters the economic loss calculation.”⁷⁶ Even setting aside the fact that his approach ignores supply-side factors, Mr. Boedeker’s

⁷³ Boedeker Report, ¶ 36.

⁷⁴ Boedeker Report, ¶ 58.

⁷⁵ Boedeker Report, ¶ 41.

⁷⁶ Boedeker Report, ¶ 43.

proposed damages methodology does not yield the measure of economic loss he proposed to calculate because it does not reliably estimate demand.

A. Mr. Boedeker's Proposed Methodology Does Not Reliably Estimate Demand in the Actual and But-For Worlds

47. Mr. Boedeker claims that he used a “market simulation” to generate his estimates of economic loss.⁷⁷ Specifically, for each one of his surveys Mr. Boedeker first averages the part-worths of individual respondents. Using these average part-worths, he generates estimates of the “market share” for hypothetical products using every possible combination of the labels and prices in his survey—320 possible combinations for the labels and prices in the Misrepresentations Surveys, and 160 for the labels and prices in the Omissions Surveys.⁷⁸ Then, he uses these data as part of a regression analysis that he claims “isolates the contribution of each attribute level and the market share to the variable price.”⁷⁹ This regression involves estimating a number of parameters (seven if omissions or nine if misrepresentations): a constant, a coefficient for market share, and a coefficient for every label indicating whether it is included in the hypothetical product.⁸⁰ According to Mr. Boedeker, based on his regression analysis he can “calculate demand curves for any attribute combination by varying the market share while keeping all other inputs constant,” and he is able to “draw two sets of demand curves where [he] var[ies] one particular attribute of interest while keeping all other attributes constant.”⁸¹

48. Mr. Boedeker presents his “point estimates of economic value” and lower and upper bounds of these estimates (which he describes as 95% confidence intervals) for each of the various combinations of alleged misrepresentations or omissions, for each of his surveys

⁷⁷ Boedeker Report, ¶ 163.

⁷⁸ For example, there are 320 possible combinations of the five types of labels and five prices in Mr. Boedeker's Orijen Misrepresentations Survey: with and without the “Biologically Appropriate” label, with and without the “Whole Prey” label, with and without the “Low Temperature” label, with and with one of the “Fresh,” “Regional,” “Fresh or Regional,” or without them, and with one of the five possible prices. See Boedeker Report, ¶ 126, footnote 60.

⁷⁹ Boedeker Report, ¶ 166. I note, however, that the confidence intervals that Mr. Boedeker presents in Table 14 and in Appendix 4, and that are the basis for the damages bounds he presents in Table 16 of his report, are based on a different calculation than what he described. I describe this calculation of lower and upper bounds in Section VI.C.

⁸⁰ Mr. Boedeker excludes from his regression those products with an estimated market share smaller than 0.1% or larger than 99.9%.

⁸¹ Boedeker Report, ¶ 166.

separately, in Table 14 and Appendix 4 of his report. According to Mr. Boedeker, he calculates these confidence intervals by estimating the regression described above using 1,000 different possible values or “draws” for the part-worths that he estimated.⁸²

49. Contrary to Mr. Boedeker’s claims, his methodology does not provide estimates of damages he purports to calculate. First, Mr. Boedeker does not calculate proper demand curves for the At-Issue Products in either the actual or but-for worlds. To do this, he would have to define the relevant characteristics of the At-Issue Products in the actual and but-for worlds, including not only the labels in his survey but also the key attributes that define a product like dog food, such as brand, flavor, and ingredients, among others. He would also need to consider factors not included on the product packaging that may drive consumer demand, such as veterinarian recommendations, or word of mouth endorsements from friends, neighbors, and other pet owners who had experience with Champion products. In addition, he would have to consider substitute products, from Champion or other competitors, which would affect the consumer response to any price or attribute changes in the focal products. Mr. Boedeker’s analysis does not consider any attributes other than the labels in his survey and does not consider any alternative products whatsoever. Mr. Boedeker’s method simply generates estimates of so-called market shares for various combinations of labels in his survey, not estimates of the actual and but-for world demand for the At-Issue Products, and then averages these estimates using a regression model. It is not clear that this average has any economic interpretation, and Mr. Boedeker does not provide any discussion as to why such a calculation is economically meaningful. This renders Mr. Boedeker’s estimates unreliable.

50. Second, Mr. Boedeker claims to calculate a price point on his but-for world demand curve that ensures that the same number of units that were sold in the actual world would also be sold in the but-for world.⁸³ He claims this analysis represents a market price because he is focusing on the willingness to pay of the “marginal consumer.”⁸⁴ However, Mr. Boedeker does not calculate any price point *on* a demand curve, in the but-for world or otherwise. He also does not calculate a price point at any specific quantity, including the actual quantity supplied by Champion. Instead, he averages the distance in price between his purported

⁸² Boedeker Report, ¶ 169.

⁸³ Boedeker Report, ¶ 41.

⁸⁴ Boedeker Report, ¶ 43.

demand curves for 320 hypothetical products with different combinations of labels and prices. There is no guarantee that a price difference calculated in this way corresponds to the difference in prices at any quantity (including the quantity sold in the actual world), or to the difference in willingness to pay of any one market participant (including the marginal consumer in the but-for world). Because of this defect, Mr. Boedeker's estimates of economic loss are unreliable.

51. Finally, Mr. Boedeker's methodology for the calculation of the economic loss due to a combination of labels (which he shows in his Appendix 4) results in inconsistent and unreliable estimates. This is important because Mr. Boedeker presents results for a number of combinations of omissions or misrepresentations that do not appear directly in his survey, so he must infer the loss percentage for combinations by combining estimates of the loss percentages for the individual components. As a theoretical matter, the loss contribution of any combination could be more, or less, or the same as the sum of the contributions components that make up the contribution,⁸⁵ so it cannot be assumed—as Mr. Boedeker does—that adding the loss contributions together provides reliable estimates.

52. For example, to calculate the economic loss due to the combination of “Biologically Appropriate” and “Regional Ingredients,” Mr. Boedeker sums the regression coefficients for the labels “Biologically Appropriate” and “Regional Ingredients” and translates these coefficients into an estimated economic loss percentage using a mathematical formula.⁸⁶ Mr. Boedeker relies on similar aggregations for 3 of his 7 Orijen Misrepresentation estimates, 10 of his 15 Acana Misrepresentations estimates, 11 of his 15 Orijen Omissions estimates, and 11 of 15 Acana Omission estimates.⁸⁷

53. However, Mr. Boedeker uses a different methodology to calculate the economic loss due to the combined label “Fresh Regional Ingredients.” In this case, he included the combination of labels “Fresh” and “Regional” directly in his Misrepresentation Surveys.⁸⁸ Critically, the results he obtains for the label “Fresh Regional Ingredients” are significantly different from the results one obtains from combining the separate labels “Fresh Ingredients” and “Regional Ingredients” using his own methodology for combining separate labels—as

⁸⁵ Mr. Boedeker's methodology sums the logarithm of the loss contributions of individual labels to calculate a total loss contribution for a combination of labels. He then applies a mathematical formula to convert the total loss contribution into a percentage estimate of economic loss.

⁸⁶ Boedeker Report, ¶ 169 and Backup Materials.

⁸⁷ Boedeker Report, Appendix 4.

⁸⁸ Boedeker Report, Tables 5–6.

shown in Table 1. In other words, Mr. Boedeker's methodology is unreliable because he cannot determine if his estimates of economic loss due to a given combination of labels would be different had he included such a combination directly in his surveys. Table 1 suggests that Mr. Boedeker's estimates of combinations would indeed be different if he asked about the combinations directly; moreover, combining the individual contributions could significantly overstate any economic loss due to combinations of the alleged misrepresentations or omissions that were not included directly in his survey.

Table 1
Estimate of Economic Loss for the Combination of Labels
“Fresh Ingredients” and “Regional Ingredients”

	Mr. Boedeker's Estimate (Label Combination Included Directly in Survey)			Estimate Based on Mr. Boedeker's Damages Methodology (Label Combination Not Included Directly in Survey)		
	Lower Bound	Point Estimate	Upper Bound	Lower Bound	Point Estimate	Upper Bound
Orijen Misrepresentations	11.8%	15.2%	18.4%	20.5%	26.5%	32.0%
Acana Misrepresentations	10.9%	15.0%	18.9%	17.1%	24.4%	31.1%

Source: Boedeker Report and Backup Materials

54. Mr. Boedeker's methodology is also unreliable for the calculation of economic loss due to any combination of misrepresentations and omissions. While the Boedeker Report does not present an estimate of economic loss from the combination of omissions and misrepresentations, Mr. Boedeker stated in deposition that the method for calculating damages for a product that includes both alleged misrepresentations and alleged omissions is to sum the percentage estimates of economic loss for each.⁸⁹ This proposed methodology, which would sum two separate estimates, based on two different surveys, two different part-worth calculations, and two different demand-estimation regressions, is contrary to scientific principles. Mr. Boedeker cannot reliably combine the results of two different surveys because such an analysis could not account for any effects caused by the combination of different labels in the same survey. Mr. Boedeker cannot simply assume that respondents

⁸⁹ Boedeker Colangelo Deposition, p. 100:1–5 (“THE WITNESS: The combined impact of omissions and misrepresentations would be the sum of whatever combination you're looking for here – Q. BY MR. SHACKELFORD: Okay. A -- that is shown in this table).

would behave in the same way had he included misrepresentations and omissions simultaneously in a survey.

55. Mr. Boedeker seems to claim that his proposed sum would be appropriate if the results of the Misrepresentation and Omissions Surveys were “independent.”⁹⁰ Mr. Boedeker does not know if the results for the alleged misrepresentations and the results for the alleged omissions are independent because he has not tested it, and his report offers no method to do so.⁹¹ Regardless, Mr. Boedeker’s part-worth estimation methodology (the basis for his economic loss calculations) depends critically on the assumption that all relevant attributes are estimated *simultaneously*—whether they are independent or not. Moreover, his approach does not allow him to measure how his part-worth estimates for attributes he did include in a survey would change had he included additional attributes even if the additional attributes were independent from the original attributes. Therefore, Mr. Boedeker’s claim that it is appropriate to sum the economic loss estimates from his separate omissions and misrepresentations surveys is inconsistent with the assumptions he makes to calculate those separate estimates.

B. Mr. Boedeker’s Estimates of Economic Loss Ignore Substantial Heterogeneity across His Survey Respondents

56. Mr. Boedeker fails to estimate properly any change in the demand curve for the At-Issue Products because he ignores the substantial heterogeneity across the respondents of his surveys. While Mr. Boedeker’s survey methodology allows him to estimate different part-worths for different respondents to his survey,⁹² his estimates of economic loss are based on the average of these part-worths across all respondents.⁹³ As discussed earlier, there is no

⁹⁰ Boedeker Colangelo Deposition, pp. 101:20–102:6 (“Q. Okay. And then Mr. Shackelford was asking you about Appendix 4 just a bit ago and about whether you could combine the results of the misrepresentations and omissions survey. Your testimony about whether those results could be combined, did that assume that the misrepresentations results and the omissions results were independent or dependent? A. Adding those two means that they are independent, it’s based on that assumption, which is something that I have not tested. But under the assumption of independence they’re edited [sic]”).

⁹¹ Boedeker Colangelo Deposition, p. 102:7–18 (“Q Okay. So you don’t know sitting here today whether they’re independent or dependent because you didn’t test that? A. That’s right. I haven’t tested it, so I don’t know the degree of any dependency or independence. Q. And in your report and as part of your expert opinions in this case, are you opining that the omissions damages and the misrepresentations damages are additive? A. Again, I have not opined on that because I haven’t done the tests necessary. I report the damages as they are one by one in my report”).

⁹² Boedeker Report, ¶ 91.

⁹³ Boedeker Production Materials.

guarantee that an average of the preferences across a group of consumers would be informative in any way of the demand curve of that group of consumers.⁹⁴ This is, in part, because whether a consumer buys or not depends on their individual WTP relative to price; it has nothing to do with the WTP of other consumers.

57. By ignoring the different preferences of his survey respondents and relying instead on an average across respondents, Mr. Boedeker methodology masks the effects that this variability could have on his estimates. When information about the preferences of individual respondents is considered, Mr. Boedeker's methodology generates estimates of economic loss that are significantly lower than the ones he presents in his report. Specifically, while Mr. Boedeker's regression model uses 320 (or 160) data points calculated using the average part-worths across all survey respondents, Table 2 shows the results of estimating Mr. Boedeker's model using 320 (or 160) data points *per respondent*—data he generated from his survey responses. Table 2 shows that Mr. Boedeker's methodology applied to this larger set of data generates estimates of economic losses that are either negative or an order of magnitude smaller than the ones shown in the Boedeker Report, and the majority of these estimates are statistically not different from zero.

⁹⁴ See, e.g., Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, "Valuation of Patented Product Features," *The Journal of Law and Economics* 57, no. 3 (August 2014): 629–663 at 651 ("[T]here is no compelling reason to prefer the mean over any other scalar summary of the distribution of WTP. Some propose using a median value of WTP instead. Again, there are no economic arguments as to why the mean or median or any other summary should be preferred. The statistical properties of various summaries (for example, mean versus median) are irrelevant, as we are not considering the sampling performance of an estimator but rather the appropriate summary of a population distribution. A proper economic valuation will consider the entire demand curve as well as competitive and cost considerations").

Table 2
Alternative Point Estimates of Economic Value with 95% Confidence Intervals^[1]

Attribute	Lower Bound	Point Estimate	Upper Bound	P-Value
Orijen Misrepresentations				
Biologically Appropriate	-0.4%	-0.1%	0.2%	0.65
Whole Prey	-0.2%	0.0%	0.3%	0.95
Low Temperature	-0.1%	0.1%	0.3%	0.48
Fresh	-0.3%	0.1%	0.4%	0.63
Fresh & Regional	-0.1%	0.2%	0.6%	0.24
Regional	-0.1%	0.2%	0.5%	0.27
Nourish	-0.4%	-0.1%	0.2%	0.59
Orijen Omissions				
Preservatives	0.0%	0.1%	0.1%	0.14
Expired	0.1%	0.2%	0.4%	0.00
Heavy Metals	0.2%	0.4%	0.7%	0.00
BPA	0.2%	0.3%	0.5%	0.00
Regrinds	0.0%	0.1%	0.1%	0.17
Acana Misrepresentations				
Biologically Appropriate	-0.2%	0.0%	0.3%	0.74
Whole Prey	-0.3%	-0.1%	0.2%	0.61
High Palatability	-0.4%	-0.1%	0.2%	0.66
Fresh	-0.4%	0.0%	0.3%	0.89
Fresh & Regional	-0.4%	0.0%	0.3%	0.83
Regional	-0.2%	0.1%	0.4%	0.42
Nourish	-0.6%	-0.2%	0.2%	0.31
Acana Omissions				
Preservatives	0.0%	0.1%	0.2%	0.00
Expired	0.2%	0.3%	0.5%	0.00
Heavy Metals	0.5%	0.7%	1.0%	0.00
BPA	0.3%	0.4%	0.6%	0.00
Regrinds	0.0%	0.1%	0.1%	0.16

Source: Boedeker Report and Backup Materials

Note:

[1] Estimates of economic loss (and bounds) are generated by applying Mr. Boedeker's regression methodology on a dataset including the shares of preference that each respondent would have for the 320 (or 160) combinations of labels and prices in Mr. Boedeker's survey. The shares of preference of each respondent are calculated using the average part-worths estimated by Mr. Boedeker for that respondent. Errors are clustered by respondent.

58. Another way to see that Mr. Boedeker's estimates are unreliable and do not incorporate the significant heterogeneity in the preferences of putative Class members is to use his approach to calculate economic loss for individual respondents. If the results for individual respondents is meaningfully different than his estimates calculated by averaging across all respondents, it indicates that his conclusions are not being fully dictated by the data, but by the methodological choice to average all respondents together. Table 3 shows

that applying Mr. Boedeker's regression methodology using the part-worths of each respondent to estimate economic loss on an individual level generates *negative* economic losses for 2% to 28% of respondents, depending on the alleged misrepresentation or omission. In other words, for a large number of respondents there is no evidence that the labels at issue would cause the decrease in WTP claimed by Mr. Boedeker, and Mr. Boedeker cannot be certain that the WTP of the marginal consumer would be lower in the but-for world.

Table 3
Survey Respondents with Negative Estimates of Economic Losses

Label	Total Respondents	Respondents with Negative Economic Loss
Orijen Misrepresentations		
Biologically Appropriate	653	6.3%
Whole Prey	653	9.2%
Low Temperature	653	11.6%
Fresh	653	2.9%
Fresh & Regional	653	2.1%
Regional	653	2.6%
Nourish	653	4.9%
Orijen Omissions		
Preservatives	585	35.0%
Expired	585	17.4%
Heavy Metals	585	17.4%
BPA	585	18.8%
Regrinds	585	27.5%
Acana Misrepresentations		
Biologically Appropriate	566	8.3%
Whole Prey	566	15.0%
High Palatability	566	8.0%
Fresh	566	3.4%
Fresh & Regional	566	4.8%
Regional	566	6.0%
Nourish	566	4.4%
Acana Omissions		
Preservatives	571	27.5%
Expired	571	17.2%
Heavy Metals	571	16.6%
BPA	571	17.0%
Regrinds	571	27.0%

Source: Boedeker Report and Backup Materials

Note:

[1] Each respondent's economic loss is estimated using Mr. Boedeker's regression methodology applied to the average part-worths estimated by Mr. Boedeker for that respondent. Data for each regression includes all possible combinations of labels and prices.

59. Mr. Boedeker states that an analysis of economic loss at the individual level “will provide unreasonable results and would not be reliable.”⁹⁵ He then claims that “[i]t is well-

⁹⁵ Boedeker Report, ¶ 91.

established that individual level part-worth estimates of conjoint models are not reliable at the individual level and that results should only be considered at the aggregate level.”⁹⁶ Mr. Boedeker is incorrect, as I explain below.

60. Mr. Boedeker cites a book by Mr. Brian Orme to support his claim that individual level part-worths are not reliable. However, he mischaracterizes Mr. Orme’s book, which in fact provides ample support for the use of individual-level estimates from well-designed conjoint surveys. Mr. Boedeker cites one passage of the book by Mr. Orme that states:

Since the late 1990s, hierarchical Bayes has permitted individual-level estimation of part-worth utilities from CBC data. But to compute individual level models, HB uses information from many respondents to refine the utility estimates for each individual. Therefore, one usually does not calculate utilities [part-worths] using a sample size of one.⁹⁷

This passage does not support the claim that individual level part-worth estimates are not reliable at the individual level, but instead indicates that a conjoint survey should not be conducted with a sample size of one because the responses of many respondents are used to generate the utility estimates for each individual.^{98, 99} Moreover, contrary to Mr. Boedeker’s claim, the book by Mr. Orme contains several mentions of the benefits of relying on individual level part-worth estimates, and of the problems with relying on aggregate estimates. For example:

[W]ith the availability of latent class and hierarchical Bayes (HB) estimation methods starting in the late 1990s, both group- and individual-level analyses are accessible and practical.¹⁰⁰

⁹⁶ Boedeker Report, ¶ 92.

⁹⁷ Bryan K. Orme, *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*, 3rd edition, (Manhattan Beach, CA: Research Publishers LLC, 2014) (“Orme (2014)”), p. 68.

⁹⁸ This interpretation is confirmed by the context surrounding the passage cited by Mr. Boedeker, which refers to the recommended sample size for conjoint surveys.

⁹⁹ Mr. Boedeker quotes a second reference to support his claim that individual-level estimates are unreliable. *See* Boedeker Report, ¶ 93. He also mischaracterizes this reference, which does not provide support to Mr. Boedeker’s claim. Instead, the reference cited by Mr. Boedeker explains that the Hierarchical Bayes method generates a distribution of possible values for the part-worths of individual respondents. As I explain in the next section, Mr. Boedeker’s estimates of economic loss do not consider the distribution of the possible values for the part-worths of individual respondents.

¹⁰⁰ Orme (2014), p. 46.

[A]cademics and practitioners have argued that consumers have unique preferences and idiosyncrasies and that aggregate-level models that assume homogeneity cannot be as accurate as individual-level models.¹⁰¹

The benefits of individual-level part-worths make a compelling argument for HB estimation.¹⁰²

A key consideration is how well these models can predict individual, combinatorial choices. In other words, how well can the models predict the exact combination of items each respondent would pick from the menu, given a set of menu items and prices? So far, the evidence shows that HB can do a creditable job in this regard.¹⁰³

Indeed, it is understood that an advantage of the HB methods used by Mr. Boedeker is that it can produce information about individual consumer-level part worths.¹⁰⁴ Not only does Mr. Boedeker discard such information by averaging, the analysis above indicates that by doing so his conclusions do not reliably reflect the results of his survey (under the assumption that all of his other methodological choices were valid; many of which were not, as I explain elsewhere in this report).

C. Mr. Boedeker's Lower and Upper Bounds for His Estimates of Percent Economic Loss Are Unreliable and Misleading

61. Mr. Boedeker presents estimates of lower and upper bounds of his economic loss calculations, which he presents as “95% confidence intervals” for his estimate of percentage economic loss.¹⁰⁵ These claims about his bounds are incorrect and misleading. His methodology does not correspond to conventional methods for constructing such confidence intervals,¹⁰⁶ and these purported confidence intervals mask considerable uncertainty in his estimates.

¹⁰¹ Orme (2014), p. 47.

¹⁰² Orme (2014), p. 48.

¹⁰³ Orme (2014), p. 141.

¹⁰⁴ Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, “Valuation of Patented Product Features,” *The Journal of Law and Economics* 57, no. 3 (August 2014): 629–663 at 650.

¹⁰⁵ Boedeker Report, Table 14 and Appendix 4.

¹⁰⁶ See, e.g., Frank E. Harrell, Jr., “Regression Modeling Strategies,” 2nd edition (New York, NY: Springer Series in Statistics, 2015), pp. 198–199.

62. Mr. Boedeker's lower and upper bounds do not represent a known or potential error rate, such as the statistical confidence intervals commonly reported in scientific work.¹⁰⁷ His lower and upper bound estimates do not reflect the many sources of error in his methodology, and instead *only* reflect variation generated by his choice to toggle the various labels in his analysis to generate his results. Mr. Boedeker's so-called confidence intervals simply reflect his decision to consider an arbitrary set of hypothetical products, including ones that do not exist in the actual or but-for worlds.¹⁰⁸

63. Mr. Boedeker's lower and upper bounds do not reflect *any* of the statistical error or potential biases in his underlying data. For example, Mr. Boedeker ignores the sampling error of using roughly 600 respondents per survey to represent the entire population of putative Class members. As noted by Professor Hanssens, the samples used by Mr. Boedeker are not representative of consumers in the Class.¹⁰⁹ For instance, only 4% of Mr. Boedeker's survey respondents currently reside in Illinois and purchased or considered purchasing a Champion product in the last 3 years.¹¹⁰ Thus, the vast majority of consumers in Mr. Boedeker's analysis have different preferences than Class members for Champion products and we know this because they did not purchase Champion products (unlike members of the putative Class). In addition, even if such consumers were representative, their choices would still only represent the choices of the putative Class members with some error.

64. Mr. Boedeker also fails to account for the uncertainty in estimating consumers' value of particular labels (the part-worths) with only 15 choice tasks. The estimates of the part-worths that Mr. Boedeker generates using conjoint survey analysis software are very

¹⁰⁷ Mr. Boedeker discusses in his report that "advanced statistical methods can be applied to compute model-based approximate confidence intervals for well-designed and well-balanced non-probability samples," and that "Sawtooth Software also allows for a non-parametric approach in computing confidence intervals." Boedeker Report, ¶ 76. However, in coming up with his lower and upper bounds, Mr. Boedeker has made no use of such advanced statistical methods, or of the capabilities of Sawtooth Software to compute confidence intervals.

¹⁰⁸ For example, Mr. Boedeker includes in his regression a product with a label, "May contain artificial preservatives. Artificial preservatives are added to food to fight spoilage caused by bacteria, molds, fungus, and yeast." See Boedeker Report, Table 7. No At-Issue Product in the actual world or in the but-for world includes such a label.

¹⁰⁹ See Hanssens Report, Section VII.A.

¹¹⁰ Boedeker Report, Table 11; Errata and Clarifications for the Expert Report of Stefan Boedeker, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, February 24, 2021.

imprecisely estimated.¹¹¹ Instead of addressing the error in his estimates, he simply averages these values to create a single value per label across all consumers and all iterations generated by the conjoint analysis software he uses, disregarding the underlying variation in these values in subsequent steps of his analysis.

65. In Table 15 of his report, Mr. Boedeker presents an alternative calculation of the confidence intervals for his estimates of economic loss, in which he attempts to account for the variation across the iterations generated by the conjoint analysis software he uses.¹¹² Specifically, Mr. Boedeker uses his software to generate 10,000 possible values for the part-worths of each of his survey respondents. Then he calculates the average across all survey respondents for each block of 10 of the 10,000 possible part-worth values to generate 1,000 average part-worths, and uses these average part-worths to conduct his regression analysis 1,000 times.¹¹³ While this approach acknowledges one source of error associated with Mr. Boedeker's estimates of part-worths (namely, that his methodology generates a range of possible values for each respondent's part-worths), his alternative calculation does not account for the two important sources of error described above. First, Mr. Boedeker's alternative method does not consider the error due to Mr. Boedeker's use of an arbitrary set of 320 (or 160) hypothetical products to perform his regression analysis. Second, Mr. Boedeker's alternative method averages the part-worths of different survey respondents, and as such, it fails to account for the variation in preferences within each respondent and across respondents. For these reasons, Mr. Boedeker's alternative estimates of confidence intervals in his Table 15 are as unreliable as those presented in Table 14 of his report.

VII. Mr. Boedeker's Comparison of His Estimated But-For Prices to the Prices of Pedigree Brand Products as a "Check" Is Inappropriate

66. Mr. Boedeker states that he "checked the reasonableness of [his] damage estimates by comparing the prices of Defendants' products to prices of non-premium dog food," and uses the example of Pedigree dog food.¹¹⁴ He claims that "[t]he misrepresentations and omissions

¹¹¹ For example, the part-worths for the "none" option in Mr. Boedeker's Orijen Misrepresentations survey range between -54 to +37 times the average part-worth used in Mr. Boedeker's calculations. See Backup Materials.

¹¹² Boedeker Report, Table 15.

¹¹³ Boedeker Report, ¶ 169.

¹¹⁴ Boedeker Report, ¶ 170.

analyzed in [his] study would erase many if not all benefits consumers perceive Defendants' products to have over non-premium products like Pedigree."¹¹⁵ Mr. Boedeker provides no support or analysis whatsoever for this opinion, and there is no reason to believe it is true.

67. To credibly make a claim that the only reason that the At-Issue Products, which Mr. Boedeker describes as premium dog food,¹¹⁶ sell for more than the non-premium Pedigree products is the alleged misrepresentations and omissions, Mr. Boedeker would need to establish that the two sets of products are identical, or at least good substitutes for Champion products, apart from the alleged misrepresentations and omissions (e.g., on product characteristics, benefits, and production costs). He has not even attempted such an analysis. In fact, there are several reasons to believe that the products are not the same apart from the alleged harmful acts.

68. First, the ingredients are not the same. For example, the first five ingredients of Champion's "Acana Meadowlands," which retails for about \$74 for a 25 lb. bag, are deboned chicken, deboned turkey, chicken liver, turkey giblets, and chicken meal,¹¹⁷ while the first five ingredients of "Pedigree Adult Complete Nutrition Roasted Chicken, Rice & Vegetable Flavor Dry Dog Food," which would retail for about \$16 for a 25 lb. bag according to Mr. Boedeker,¹¹⁸ are corn, meat and bone meal, corn gluten meal, animal fat, and soybean meal.¹¹⁹ The ingredients clearly differ between the two products. Importantly, I understand that the meat ingredients used in Champion's products are more expensive than the corn ingredients used in Pedigree products.¹²⁰ To the extent that expensive ingredients result in higher production costs, it is almost surely a reason why Champion dog food sells for higher prices than Pedigree. As an illustrative example, Table 4 shows that other brands of dog food with

¹¹⁵ Boedeker Report, ¶ 170.

¹¹⁶ Boedeker Report, ¶¶ 108, 170.

¹¹⁷ "Meadowland," *Acana*, https://acana.com/en_US/for-dogs-1/meadowland/ds-aca-meadowlands-dog.html.

¹¹⁸ Boedeker Report, ¶ 170.

¹¹⁹ "Pedigree® Adult Roasted Chicken, Rice & Vegetable Flavor Dry Dog Food," *Pedigree*, <https://www.pedigree.com/dog-foods/details/pedigree-adult-complete-nutrition-roasted-chicken-rice-vegetable>.

¹²⁰ See, e.g., Tonya Hansen and Evert Van der Sluis, "Corn-based Pet Food Production in South Dakota: Preliminary Feasibility Study," South Dakota State University Agricultural Experiment Station, October 1, 2015, p. 6 ("Corn is widely used as an ingredient in processed pet foods because it is relatively inexpensive and offers pet food companies versatility from a nutritional standpoint. While it can be used as such, corn is less suitable as a source of protein than other, more protein-rich products... Other than marketing, the industry's most expensive component is protein... Therefore, pet food companies rarely include more protein in the ration than required. Ultimately, one of the most important reasons for companies to include corn as a pet food ingredient is to minimize production costs.").

ingredients similar to Champion's, and that are not challenged in this matter, tend to sell at similar prices as Champion products. Consistent with this analysis, Plaintiffs' expert Mr. Silverman testified that comparing the ingredients from an Orijen product to those of a Pedigree product would be an "apples to oranges comparison."¹²¹

Table 4
Prices and Top Ingredients of Acana Meadowlands and Selected Dog Food Products with Deboned Chicken or Turkey as the First Ingredient

Brand	Product	Top Five Ingredients	Minimum Crude Protein (%)	Minimum Crude Fat (%)	25 LB-Bag Price ^[1]
American Journey	All Life Stages Chicken & Sweet Potato Recipe Grain-Free Dry Dog Food	Deboned Chicken; Chicken Meal; Turkey Meal; Peas; Sweet Potatoes	34	15	\$44.32
Blue Buffalo	Wilderness Chicken Recipe Grain-Free Dry Dog Food	Deboned Chicken; Chicken Meal; Peas; Pea Protein; Tapioca Starch	34	15	\$56.23
Evanger's	Grain-Free Chicken with Sweet Potato & Pumpkin Recipe Dry Dog Food	De-Boned Chicken; Sweet Potato; Chicken Meal; Chicken Fat; Fish Meal	33	16	\$61.98
Merrick	Real Chicken + Sweet Potato Recipe Grain-Free Adult Dry Dog Food	Deboned Chicken; Chicken Meal; Turkey Meal; Sweet Potatoes; Potatoes	34	17	\$65.62
Wellness Core	Wholesome Grains Original Recipe High Protein Dry Dog Food	Deboned Turkey; Chicken Meal; Turkey Meal; Oatmeal; Barley	34	16	\$70.47
Nulo	Freestyle Turkey & Sweet Potato Grain-Free Dry Puppy Food	Deboned Turkey; Turkey Meal; Salmon Meal; Chickpeas; Chicken Fat	33	18	\$73.99
Acana	Meadowland Grain-Free High Protein Freeze-Dried Coated Chicken Turkey Fish Cage-Free Eggs Dry Dog Food	Deboned Chicken Liver Deboned Turkey Giblets Chicken Chicken Meal	33	17	\$73.99
Hound & Gatos	Grain-Free Cage Free Turkey Recipe Dry Dog Food	Deboned Turkey; Egg; Sweet Potato; Tapioca; Turkey Fat	28	17	\$95.50

Source: Chewy.com; Petco.com; Boedeker Report ¶ 170

Note:

[1] If a 25 lb. bag is not available, the price is interpolated using two other available bag sizes. It is the same way as Mr. Boedeker estimated the implied 25 lb. bag price of Pedigree dog food in ¶170 of the Boedeker Report. All prices were collected on the same date. The price of Acana Meadowlands Dry Dog Food was collected from Petco.com, and all other prices were collected from Chewy.com. When available, the "list price" is used from Chewy.com.

69. Champion and Pedigree products are also not comparable based on the attributes they offer unrelated to the alleged misrepresentations and omissions. For example, among many other features, Champion products are marketed to consumers as having a "Freeze-Dried Coat[ing],"¹²² containing "Fresh and Raw Ingredients," and being "Rich in Animal Ingredients."¹²³ On the other hand, the website cited by Mr. Boedeker describes Pedigree

¹²¹ Deposition of Bruce Silverman, *Jennifer Song, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court District of Minnesota, MDL Case No. 18-cv-03205-PJS-KMM, November 24, 2020, ("Silverman Song Deposition"), pp. 133:20-134:3 ("Q: [...] Would you agree that it's an unfair comparison to compare the ingredients from Orijen Original to the ingredients of the popular-priced Pedigree product? [...] THE WITNESS: I would say -- as a consumer I would say it's an apples to oranges comparison, particularly based on the ultimate price point of the products").

¹²² See, e.g., "Original," *Orijen*, https://orijen.ca/en_US/for-dogs-2/original/ds-ori-original-dog.html.

¹²³ See, e.g., "Meadowland," *Acana*, https://acana.com/en_US/for-dogs-1/meadowland/ds-aca-meadowlands-dog.html.

products as having the key benefits of “[c]omplete and balanced nutrition [that] has antioxidants,” “[o]ptimal levels of omega-6 fatty acid,” and “[w]hole grain and special fiber,” among others.¹²⁴ Because dog food products are differentiated products,¹²⁵ the benefits that consumers expect to obtain from these attributes are likely to be different as well. For example, according to WebMD, benefits from a raw dog food diet that Champion touts with its products include shinier coats, healthier skin, cleaner teeth, higher energy levels, and smaller stools.¹²⁶ On the other hand, Pedigree touts healthy bones and joints, strong immune systems, and healthy digestion as potential benefits of its products.¹²⁷ Mr. Boedeker has not done any analysis that would indicate that Pedigree products would be considered substitutes for Champion products given these differences, especially for putative Class members who, by their choices, have indicated a preference for the attributes of Champion products.

70. Similarly, Mr. Boedeker has not done any analysis that would indicate that eliminating the alleged misrepresentations and omissions would make Pedigree products comparable to or suitable substitutes for Champion’s products.¹²⁸ Mr. Boedeker cannot assess how many of the unchallenged benefits provided by Champion products would be erased by the alleged misrepresentations and omissions because his analysis makes no attempt to measure such unchallenged benefits. Mr. Boedeker’s conjoint analysis does not attempt to measure the value of any unchallenged attributes other than his decoy labels. Moreover, his comparison considers only one retail price of a single Pedigree product, and ignores the wide variety of unchallenged attributes of the At-Issue Products.

71. Additional differences between Champion and Pedigree products include the retail locations they sell and the type of customers that buy each brand. Champion’s products

¹²⁴ Boedeker Report, Figure 11; Pedigree Adult Complete Nutrition Roasted Chicken, Rice & Vegetable Flavor Dry Dog Food, <https://www.chewy.com/pedigree-adult-complete-nutrition/dp/141438>.

¹²⁵ See Section VIII.A.

¹²⁶ Elizabeth Lee, “Raw Dog Food: Dietary Concerns, Benefits, and Risks,” Fetch by WebMD, <https://pets.webmd.com/dogs/guide/raw-dog-food-dietary-concerns-benefits-and-risks#1>

¹²⁷ “Pedigree® Big Dogs Roasted Chicken, Rice & Vegetable Dry Dog Food,” *Pedigree*, <https://www.pedigree.com/dog-foods/details/pedigree-for-big-dogs-adult-complete-nutrition-roasted-chicken-rice-vegetable>.

¹²⁸ See, e.g., Boedeker Colangelo Deposition, p. 82:6–18 (“And when you got to that and saw okay based on the results of the survey Champion would be slotted here in the same price range as these low-priced pet foods, did you take it any step further to see on a per protein basis, per calorie basis, per nutrient basis, do any sort of comparison of whether Champion really did from a nutritional standpoint compare with those lesser expensive products? ... THE WITNESS: Yeah. I did not analyze that matter”).

include a few online stores and a selected network of retail chains and specialty stores.¹²⁹ I understand that during the period from June 2016 to 2018, Champion products were not available in big box stores; beginning in 2019, Champion products were available at Petco, a large chain selling pet food and supplies.¹³⁰ On the other hand, Pedigree products are available in a wide variety of retail stores, including discount stores.¹³¹ Consistent with the differences in distribution, consumers who buy each brand may be different as well. Plaintiffs' expert Mr. Silverman stated that the type of consumers who purchase Champion products is not likely to purchase Pedigree products.¹³²

72. Finally, when Mr. Boedeker states that "the perceived value of products without the misrepresentations and without the omissions would be similar to the price of non-premium products like Pedigree,"¹³³ he is comparing a Champion product that includes a disclosure about the presence of heavy metals and BPA to a Pedigree product without such disclosures. However, I understand from Defendant's expert Dr. Robert Poppenga that nearly all dog foods (including Pedigree) have measurable levels of heavy metals, and many have, or have the risk of containing, a measurable amount of BPA.¹³⁴ Also, one of Plaintiffs' experts, Dr. Sean Callan, stated in a related litigation matter that about a third of the hundreds of different dog food products he had tested had a quantifiable amount of BPA.¹³⁵ He also stated that, of the two-thirds of the products for which he did not find a quantifiable amount of BPA, it is

¹²⁹ See, e.g., "Where to Buy," *Acana*, https://acana.com/en_US/where-to-buy; "Where to Buy," *Orijen*, https://orijen.ca/en_US/where-to-buy. Both brands explicitly state that a number of discount retailers are not official distributors of Champion products.

¹³⁰ Jordan Tyler, "Champion brands added to Petco shelves," PetFood Processing, January 17, 2019, <https://www.petfoodprocessing.net/articles/12862-champion-brands-added-to-petco-shelves>.

¹³¹ See, e.g., "Pedigree Dog Food," *Walmart*, https://www.walmart.com/browse/pets/pedigree-dog-food/5440_202072_6432755_4978338_7520899; "Pedigree Adult Complete Nutrition Roasted Chicken, Rice & Vegetable Flavor Dry Dog Food, 33 lb.," *Dollar General*, <https://www.dollargeneral.com/products/product-page/pedigree-adult-complete-nutrition-roasted-chicken-rice-vegetable-flavor-dry-dog-food-33-lb.html>.

¹³² Silverman Song Deposition, pp. 135:11–14 ("I doubt very much that consumers that are inclined to buy a product like Acana or Orijen are, you know, hot to buy Pedigree. They're oriented to get a premium product for their dog"). Similarly, Mr. Boedeker testified that a consumer considering a bag of dog food for \$9.99 would not consider a same-sized bag of Champion dog food for \$64. Boedeker Song Deposition, p. 44:3–7.

¹³³ Boedeker Report, ¶ 173.

¹³⁴ Expert Report of Dr. Robert H. Poppenga DVM, PhD, DABVT, with Exhibits, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern Illinois, Eastern Division, Case No. 1:18-cv-06951, February 19, 2021, pp. 15–20, 30–32.

¹³⁵ Deposition of Sean P. Callan, *Jennifer Reitman, et al. v. Champion Petfoods*, United States District Court for the Central District of California Western Division, Case No. 2:18-CV-01736-DOC(JPR) ("Callan Deposition"), May 9, 2019, p. 54:10–15.

possible that he would have detected an amount of BPA had he used a more sensitive test.¹³⁶ If Pedigree consumers are aware (or are made aware) of the content of heavy metals and possibly BPA in Pedigree dog food in the same way as Mr. Boedeker assumes Champion consumers would be in the but-for world, then his comparison is defective.

VIII. Mr. Boedeker Offers No Basis to Assume a Common Impact of the Challenged Conduct on the Putative Class Members, and Individual Inquiry Is Likely Required to Establish the Price Paid and the But-For Price of the At-Issue Products

A. Dog Food Is a Differentiated Product, Therefore Changes in the Information on the Packages of the At-Issue Products Will Not Affect the Prices of All Products in the Same Way

73. Mr. Boedeker's damages analysis assumes that all Illinois residents who purchased an At-Issue Product by Acana (or Orijen) containing the same alleged misrepresentations or omissions during the proposed class period experienced a uniform injury.¹³⁷ This assumption is inconsistent with the economics of the dog food market.

74. As noted earlier, the dog food market is an example of what is termed a differentiated product market in economics. Differentiated product markets contain a large number of different products with different attribute combinations. The large number of products is intended to appeal to consumers who have different preferences over product attributes.¹³⁸ In contrast to commodity markets (e.g., a share of IBM stock, or exchange-traded commodities like crude oil or wheat), or products with a single market price (e.g., some internet subscription services), there is no single market price for differentiated products as different consumers with different preferences and information purchase many different products from different sales channels at different prices.¹³⁹ This diversity of underlying conditions makes it exceedingly unlikely that any change in product characteristics will affect the prices of all products in the same way, contrary to Plaintiffs' assumptions.

¹³⁶ Callan Deposition, p. 59:11–16 (“Q. So of the two-thirds, approximately, that did not have a parts per billion of above 30, is it possible that they would have had some detectable level of BPA at less than 30 parts per billion? A. It is possible, yes”).

¹³⁷ Boedeker Report, Table 14 and Appendix 4.

¹³⁸ See, e.g., Jean Tirole, *The Theory of Industrial Organization* (Cambridge, MA: MIT Press, 1988), Chapter 7.

¹³⁹ The At-Issue Products are examples of differentiated products. For example, Mr. Boedeker stated that consumers in the market for dog food have “different levels of understanding and different levels of interpretations of [the product] attributes.” Boedeker Song Deposition, p. 59:11–14.

75. One obvious way to observe that the dog food market is a differentiated market is the large number of different products simultaneously available in the marketplace. For instance, the At-Issue Products alone include dozens of different stock keeping units (“SKUs”) representing 11 different formulations (or diets) sold in multiple package sizes.¹⁴⁰ However, the At-Issue Products only represent a small portion of the overall number of products available to dog food purchasers. For instance, various review and comparison sites suggest that there are hundreds of different dog food formulations available for purchase at any given time.¹⁴¹ These formulations differ along a number of dimensions including protein type (e.g., chicken, fish), fat or grain content, dry versus freeze-dried food, and package size, among others.¹⁴² Dog food products are also produced by a large number of companies. For example, an industry study suggests that in 2019 there were 48 global pet food companies each with more than \$100 million in sales.¹⁴³

76. The Hanssens Report describes the different consumer preferences over different product attributes (e.g., nutritional quality, meat content, ingredient freshness, among others) and how these preferences can change over time as the dietary requirements of dogs change as they age, or by the recommendation of important third parties such as veterinarians.¹⁴⁴ Given this diversity of preferences, there is no reason to believe that a change in the information on the package of At-Issue Products would have exactly the same effect across a large group of consumers purchasing different products over many years.

77. Consumers who may already be aware of the information regarding some or all of the alleged misrepresentations or omissions that Plaintiffs claim in this matter would be affected differently than other consumers (or not affected at all) by the addition of Mr. Boedeker’s corrective statements to product packaging, and would have experienced different or no harm from the alleged omissions. That is, to the extent that some putative Class members—

¹⁴⁰ See, e.g., CPF0017614.xlsx; CPF0017743.xlsx.

¹⁴¹ As of March 24, 2021, the site www.dogfoodadvisor.com shows 476 reviews of dry dog food. See “View All Dry Dog Foods,” *Dog Food Advisor*, <https://www.dogfoodadvisor.com/dog-food-reviews/dry/all/>. A search on Amazon.com using the keyword “dog food” and filtering for “Bag Weight 16 to 25.9 Pounds” shows 617 products. A search on Google Shopping using the keyword “dog food” and filtering for “Size over 26lb” shows 336 products.

¹⁴² See, e.g., the various dog food products available on Acana’s website: “Red Meat Formula,” *Acana*, https://acana.com/en_US/for-dogs-1/red-meat-formula/ds-aca-red-meat.html; “Wild Atlantic,” *Acana*, https://acana.com/en_US/for-dogs-1/wild-atlantic/ds-aca-wild-atlantic-dog.html; “Meadowland,” *Acana*, https://acana.com/en_US/for-dogs-1/meadowland/ds-aca-meadowlands-dog.html.

¹⁴³ See “Top 50 pet food companies worldwide,” *Watt Global Media*. Champion Petfoods is ranked 32nd.

¹⁴⁴ Hanssens Report, ¶ 66.

through their own research or knowledge—were aware of the potential for the substances at issue to be present in the At-Issue Products, and yet continued to buy them, these consumers could not have been harmed because of the alleged omissions or misrepresentations. For example, Champion made public the results of its tests regarding the presence of heavy metals in its foods.¹⁴⁵ Thus, at least some consumers were likely aware of the extent to which Champion products contain certain quantities of the various substances at issue in this case.

78. Differences in information could also include general knowledge that buyers may have about the product or its ingredients. The corrective statements used in Mr. Boedeker's Omissions Surveys refer to the risk that the product "may contain" expired ingredients, heavy metals, BPA, or regrinds, and are not specific to a certain amount of these substances (or any presence at all).¹⁴⁶ The risk of presence of these substances in many of the ingredients of the At-Issue Products, either naturally occurring or as a result of human intervention, may be known to many consumers.¹⁴⁷ For example, it is widely known by consumers that fish generally, and wild caught fish specifically, have a risk of presence of mercury, and consumption should be limited to a specific level (especially for pregnant women, for whom there exist guidelines for how much to eat and what to avoid).¹⁴⁸ Buyers who are aware of the risk of presence of these substances could not have been harmed due to the alleged omissions.

79. Another characteristic that undermines the idea of a common price impact is that many product markets also show what economists refer to as "price dispersion," or variation in prices paid for the same product.¹⁴⁹ For example, buyers can pay different prices for a 13-

¹⁴⁵ "Orijen and Acana Foods in Comparison to Pet Food Safety Standards," *Champion Petfoods*, May 2017.

¹⁴⁶ Boedeker Report, ¶¶ 121–122, Table 10.

¹⁴⁷ See, e.g., "Metals and Your Food," *U.S. Food and Drug Administration*, <https://www.fda.gov/food/chemicals-metals-pesticides-food/metals>; Shanti Menon, "Mercury Guide," *NRDC*, March 10, 2016, <https://www.nrdc.org/stories/mercury-guide>; "Bisphenol A (BPA) Factsheet," *Centers for Disease Control and Prevention*, https://www.cdc.gov/biomonitoring/BisphenolA_FactSheet.html.

¹⁴⁸ See, e.g., "Mercury Guide," *NRDC*, <https://www.nrdc.org/stories/mercury-guide>; "Advice about Eating Fish," *U.S. Food and Drug Administration*, <https://www.fda.gov/food/consumers/advice-about-eating-fish>; "Guidelines for Eating Fish that Contain Mercury," *United States Environmental Protection Agency*, <https://www.epa.gov/mercury/guidelines-eating-fish-contain-mercury>; "Fish Advisories," *Illinois Department of Public Health*, <https://www.dph.illinois.gov/topics-services/environmental-health-protection/toxicology/fish-advisories>; "New York State Health Advice on Eating Fish You Catch," *New York State Department of Health*, https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/; "Statewide Safe Fish Guidelines," *Michigan Department of Health and Human Services*, https://www.michigan.gov/documents/mdch/Statewide_Mercury_Advisory_Fact_Sheet_2010-07_327066_7.pdf.

¹⁴⁹ Michael R. Baye, John Morgan, and Patrick Scholten, "Information, Search, and Price Dispersion," in *Handbooks in Information Systems, Vol. I*, T. Hendershott, ed. (Elsevier, 2006). See also Hal R. Varian, "A Model of Sales," *American Economic Review* 70, no. 4 (September 1980): 651–659 ("Economists have

pound package of Acana Regionals Appalachian Ranch Dry Dog Food depending on the web site from which they purchase—\$64.09 from Allivet.com and \$75.68 from Ebay.com.^{150, 151}

Price dispersion may occur because different information conditions—what consumers know about products and prices—make it rational for sellers to set different prices for the same product.¹⁵² Additional price dispersion can result from consumers having preferences for specific retailers based on trust or retailer brand loyalty,¹⁵³ or because of specific attributes of retailers such as reliability (e.g., on-time delivery, tracking), convenience (e.g., ease of ordering, product selection), availability of product information, and shipping and handling services.¹⁵⁴ Strategies for shipping also vary substantially across retailers,¹⁵⁵ and can be an important component of retail competition, as consumers may react differently to the same total price depending on how it is divided between product price and shipping charges.¹⁵⁶

80. Thus, the prices for differentiated products vary because the products are different (which gives rise to different supply and demand conditions), because consumers face different information conditions, and because consumers purchase products from retailers with different characteristics. The result is that there is no single price for any product at any given time, but a diversity of prices.

81. The presence of differentiated products, differences in consumer preferences, and differences in information in the dog food market undermines the notion of a common price

belatedly come to recognize that the ‘law of one price’ is no law at all. Most retail markets are instead characterized by a rather large degree of price dispersion.”).

¹⁵⁰ “Acana Regionals Appalachian Ranch Dry Dog Food,” *Allivet*, <https://www.allivet.com/p-8688-acana-regionals-appalachian-ranch-dry-dog-food.aspx>, visited on March 10, 2021; “ACANA Regionals Appalachian Ranch Dry Dog Food (13 lb),” *eBay*, <https://www.ebay.com/itm/ACANA-Regionals-Appalachian-Ranch-Dry-Dog-Food-13-lb/173353457161/>.

¹⁵¹ As an additional example, a 4.5-pound package of Acana Heritage Free-Run Poultry was available from five different online retailers for five different prices, ranging from \$16.99 to \$25.99; a 25-pound package of Orijen Original was available from five different online retailers for five different prices, ranging from \$79.00 to \$98.41; and a 13-pound package of Orijen Six Fish was available from five different online retailers for five different prices, ranging from \$54.99 to \$75.35. See Backup Materials.

¹⁵² Michael R. Baye, John Morgan, and Patrick Scholten, “Information, Search, and Price Dispersion,” in *Handbook on Economic and Information Systems*, T. Hendershott, ed. (Elsevier, 2006).

¹⁵³ Erik Brynjolfsson and Michael D. Smith, “Frictionless Commerce? A Comparison of Internet and Conventional Retailers,” *Management Science* 46, no. 4 (April 2000): 563–585 at 580.

¹⁵⁴ Xing Pan, Brian T. Ratchford, and Venkatesh Shankar, “Can Price Dispersion in Online Markets Be Explained by Differences in E-Tailer Service Quality?,” *Journal of the Academy of Marketing Science* 30, no. 4 (2002): 433–445 at 436, 440; Michael D. Smith and Erik Brynjolfsson, “Consumer Decision-Making at an Internet Shopbot: Brand Still Matters,” *The Journal of Industrial Economics* 49, no. 4 (December 2001): 541–558.

¹⁵⁵ Emin M. Dinlersoz and Han Li, “The Shipping Strategies of Internet Retailers: Evidence from Internet Book Retailing,” *Quantitative Marketing and Economics* 4, no. 4 (2006): 407–438 at 431.

¹⁵⁶ Michael D. Smith and Erik Brynjolfsson, “Consumer Decision-Making at an Internet Shopbot: Brand Still Matters,” *The Journal of Industrial Economics* 49, no. 4 (December 2001): 541–558 at 549.

impact. The heterogeneity in the market for the At-Issue Products indicates that the economic factors affecting demand (e.g., preferences and information) as well as supply (e.g., producer cost, products in the market, competitive interactions among manufacturers and among retailers) differ across products, consumers, and time, which is inconsistent with the single common market that Mr. Boedeker inherently assumes. When there is not a common market, there is no reason to believe that a single factor or set of factors (such as the corrective statements in the Boedeker Surveys) would affect all product prices in the same way.

82. The method proposed by Mr. Boedeker does not account for any of the differences described above, instead assuming that the demand for the numerous At-Issue Products would be affected in the same way by the challenged conduct. Without properly accounting for variations in consumers' preferences for product attributes, prices paid for the product, and the information available to purchasers regarding the alleged misrepresentations and omissions, Mr. Boedeker can neither reliably calculate aggregate class-wide injury nor assign damages to individual members of the proposed Class.

B. Any Assessment of Damages to the Class Is Likely to Require Individualized Inquiry

83. Any calculation of class-wide economic loss requires knowledge of 1) the actual retail prices and quantities purchased by the putative Class members and 2) the but-for market prices that putative Class members would have paid for the At-Issue Products. As I explained previously, Mr. Boedeker's analysis cannot estimate but-for market prices because it does not account for supply-side factors and because it does not properly estimate demand. Moreover, Mr. Boedeker's methodology fails to obtain even the appropriate actual retail prices and quantities.

84. I understand that Champion does not have access to reliable consumer sales data that span the entire proposed class period. Mr. Boedeker apparently does not have access to actual retail prices and quantities, and nothing in his methodology or report indicates that he will be able to obtain those data. Instead of collecting and analyzing actual retail prices and quantities, Mr. Boedeker simply assumes that the quantities of At-Issue Products sold during the proposed class period were the quantities sold by Champion to retailers, and the prices

paid by consumers included a 40% profit margin for retailers.¹⁵⁷ Mr. Boedeker ignores that retail prices depend on multiple factors that can vary from individual to individual, such as specific retailer pricing decisions, cross-selling, special sales, or discounts and coupons.¹⁵⁸

85. In addition, the profit margin applicable to Champion products may be very different from Mr. Boedeker's assumption, which is based on estimates of the "gross profit margin of pet retail stores or pet supplies industry."¹⁵⁹ For example, pet food retailer Chewy.com, which prior to July 2017 sold Champion products,¹⁶⁰ reported a gross profit margin in 2017 of 17.5%.¹⁶¹ Mr. Boedeker testified that he did not know if the 40% profit margin he assumed included online sellers.¹⁶² Mr. Boedeker's analysis also ignores that the gross profit margin of retail stores can include multiple categories of products different from premium dog food, including non-food products or food for other species. For example, Chewy.com reported that more than 21% of its 2017 revenues came from "hardgoods" and "other" products.¹⁶³ Mr. Boedeker also failed to consider that Champion suggested different retail prices ("MSRPs") for different geographic regions.^{164, 165}

¹⁵⁷ Boedeker Report, ¶ 20.

¹⁵⁸ See, e.g., CPF1762620-1 at CPF1762620; CPF1337244-5 at CPF1337244.

¹⁵⁹ Boedeker Report, footnote 7.

¹⁶⁰ "Fromm, Champion pull products from Chewy," *PetfoodIndustry.com*, July 12, 2017, <https://www.petfoodindustry.com/articles/6552-fromm-champion-pull-products-from-chewycom>.

¹⁶¹ Chewy, Inc. Form 10-K for the fiscal year ended February 2, 2020, p. 41.

¹⁶² Boedeker Colangelo Deposition, p. 71:16-20 ("Q. And have you done anything since the last time I took your deposition to form an opinion of the mix of sales between online compared to brick and mortar stores? A. No, I have not"). See also Boedeker Song Deposition, p. 63:9-14 ("Q. Okay. Would the concept here of 'pet retail stores' include direct to consumer online sellers? A. At the moment I don't recall if -- if it was brick and mortar stores that this study reported or if online sales were included. I just don't know that at the moment").

¹⁶³ Chewy, Inc. Form 10-K for the fiscal year ended February 2, 2020, p. 41.

¹⁶⁴ CPF2117040-48.

¹⁶⁵ I note that Mr. Boedeker did not use the actual quantity of product bought by putative Class members, but instead assumed that this quantity was the same as the quantity produced by Champion. Because of this assumption, Mr. Boedeker's estimation method will systematically overstate dollar sales. This is because, accounting for variations in inventory, the quantity produced will be more (and cannot be less) than the retail quantity sold due to product spoilage, rejected production lots, and other supply chain factors (such as retail shrink). "Shrink" is a blanket term covering numerous reasons why a product shipped to a retailer may not actually be sold. This could be due to stocking errors, improper documentation, lost items in transit, and employee theft, among others. See, e.g., Michael W. Maher, Clyde P. Stickney, and Roman L. Weil, *Managerial Accounting: An Introduction to Concepts, Methods and Uses*, 6th ed. (Orlando, FL: The Dryden Press, 1997), p. G-47. For example, Mr. Boedeker acknowledged that perishable products that do not sell before a certain date may be destroyed by the retailer. See Boedeker Song Deposition, p. 61:10-19 ("Q. Okay. And in - in your expertise in your field, do you have an opinion how retailers responded to products that have slow turn rates compared to similar products? A. Depending on -- on the type of product and how perishable it is -- right? -- it would be discounted. I mean, I ultimately stay in the store and then if a certain threshold is -- is crossed -- right? -- then it may be destroyed or somehow reworked into something else").

86. Furthermore, the Boedeker Surveys fail to capture individual differences across putative Class members in purchase decisions. For example, while Mr. Boedeker attempts to estimate what consumers would have done in the real world, the decision process in the Boedeker Surveys has no resemblance to the actual retail environment that consumers face when making purchasing decisions.¹⁶⁶ In the actual retail environment, the individual experience may vary significantly from one consumer to another, as they may be assisted by a retail sales representative or can obtain information from advertising, product literature, or other information sources such as online consumer product review or rating sites, friends and family, and professional reviews. In contrast, respondents to the Boedeker Surveys had a single and identical source of information: the images and text of the Champion product packaging and the labels they were shown.¹⁶⁷

87. For these reasons, Mr. Boedeker's assumption of uniform impact to large swaths of the proposed Class (e.g., all Class members who bought Acana products with the alleged misrepresentations) is unsupported and incorrect. As his damages methodology critically relies on this assumption, it is unreliable. Individual inquiry is required to assess properly damages, if any, to purchasers of the At-Issue Products.



Lorin M. Hitt

March 29, 2021

¹⁶⁶ Hanssens Report, ¶¶ 60–61.

¹⁶⁷ See, e.g., Boedeker Colangelo Deposition, p. 72:19–23 (“Have you done anything to inform yourself what kind of information salespersons in pet food retailers might give consumers that request questions about Champion Petfoods? A. I have not analyzed that”).

Appendix A

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Brown University	M.S. Electrical Engineering (1989)
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University of Pennsylvania, Wharton School, Philadelphia, PA. *Alberto Vitale Term Associate Professor of Operations and Information Management (2002-2008).*

University of Pennsylvania, Wharton School, Philadelphia, PA. *Alberto Vitale Term Assistant Professor of Operations and Information Management (2000-2002).*

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Massachusetts Institute of Technology, Industrial Performance Center, Cambridge, MA.

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Oliver Wyman and Company, New York, NY. *Consultant (1989-1992).*

Harry Diamond Laboratories, Adelphi, MD. *Engineering Technician (1984-87).*

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33. Hitt, Lorin M., Wu, D.J. and Xiaoge Zhou (2002). “Investment in Enterprise Resource Planning: Business Impact and Productivity Measures,” *Journal of Management Information Systems* (Special Issue on ERP) 19(1): 71-98.
34. Hitt, Lorin M. and Frances X. Frei (2002). "Do Better Customers Utilize Electronic Distribution Channels? The Case of PC Banking," *Management Science* 48(6, June): 732-749.
35. Clemons, Eric K., Hann, Il-Horn, and Lorin M. Hitt (2002). “Price Dispersion and Differentiation in Online Travel: An Empirical Investigation,” *Management Science* 48(4, April): 534-550.
36. Bresnahan, Timothy, Brynjolfsson, Erik and Lorin M. Hitt (2002). "Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-level Evidence," *Quarterly Journal of Economics*, 117(1): 339-376. [Reprinted as “Tecnología de la Información, Organización del Lugar de Trabajo y Demanda de Trabajadores Calificados: Evidencia a Partir de Datos de Empresa,” Chapter 8 in *Reformas Y Equidad Social En America Latina Y El Caribe* (Carlos Eduardo Velez and Pax Castillo-Ruiz, eds.) Banco Interamericano de Desarrollo: 135-168 (2004). An earlier version of this paper appeared as Bresnahan, Timothy, Brynjolfsson, Erik and Lorin M. Hitt (2000) “Technology, Organization and the Demand for Skilled Labor,” Chapter 5 in *The New Relationship: Human Capital in the American Corporation* (Margaret M. Blair and Thomas A. Kochan, eds.), Brookings Institution Press: 145-193.]
37. Clemons, Eric K., Hitt, Lorin M., Gu, Bin, Thatcher, Matt E. and Bruce W. Weber (2002). “Impacts of eCommerce and Enhanced Information Endowments on Financial Services: A Quantitative Analysis of Transparency, Differential Pricing and Disintermediation,” *Journal of Financial Services Research* 22(1,2): 73-90.
38. Brynjolfsson, Erik and Lorin M. Hitt (2000). “Beyond Computation: Information Technology, Organizational Transformation and Business Performance.” *Journal of Economic Perspectives*, 14(4): 23-48. [Reprinted as Brynjolfsson, Erik and Lorin M. Hitt (2004). “Information Technology, Organizational Transformation and Business Performance,” Chapter 2 in *Productivity, Inequality and the Digital Economy* (Nathalie Greenan, Yannick L’Horty and Jacques Mairesse, eds.) , MIT Press: 55-91. Also reprinted as Chapter 4 in *Inventing Organizations of the 21st Century* (Thomas Malone, Robert Laubacher and Michael S. Scott Morton, eds): 70-99.]
39. Hitt, Lorin M. (1999). “Information Technology and Firm Boundaries: Evidence from Panel Data,” *Information Systems Research*, 10(2, June): 134-149.
40. Brynjolfsson, Erik and Lorin M. Hitt (1998). "Beyond the Productivity Paradox," *Communications of the ACM*, 41(8): 49-55.
41. Hitt, Lorin M. and Erik Brynjolfsson (1997). “Information Technology and Internal Firm Organization: An Exploratory Analysis,” *Journal of Management Information Systems* 14 (2): 81-101.
42. Brynjolfsson, Erik and Lorin M. Hitt (1996). "Paradox Lost? Firm-Level Evidence on the Returns to Information Systems," *Management Science* 42 (4): 541-558. [reprinted as Section 1 Chapter 1 in *Beyond the IT Productivity Paradox*, (Leslie Willcocks and Stephanie Lester, eds.), John Wiley and Sons: 39-68 (1999) and Section 2 Chapter 1 in *Exploring Information Systems Research Approaches*, (Robert D. Galliers, M. Lynne Markus and Sue

Newell, eds.), Routledge: 109-127 (2007). An earlier version of this paper appeared as Brynjolfsson, Erik and Lorin M. Hitt (1993) "Is Information Systems Spending Productive? New Evidence and New Results," *Proceedings of the 14th Annual International Conference on Information Systems*, Orlando, FL. December: 47-64.]. Winner of the Best Paper Award in Information Systems Economics in last seven years (1999 Workshop on Information Systems and Economics).

43. Hitt, Lorin M. and Erik Brynjolfsson (1996). "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value," *MIS Quarterly* 20(2): 121-142. Winner of 1996 Best Paper award. [An earlier version of this paper appeared as Hitt, Lorin M. and Erik Brynjolfsson (1994) "The Three Faces of IT Value: Theory and Evidence," *Proceedings of the 15th Annual International Conference on Information Systems*, Vancouver, B.C., December. (Winner of Best Paper and Best Paper Addressing Conference Theme Awards): 263-277.]
44. Brynjolfsson, Erik and Lorin M. Hitt (1995) "Information Technology as a Factor of Production: The Role of Differences Among Firms", *Economics of Innovation and New Technology* 3-4: 183-199.
45. Martin, Suzanne, Hitt, Lorin M., and James Rosenberg (1989) "p-Channel Germanium MOSFETs with High Channel Mobility," *IEEE Electron Device Letters* 10(7, July): 325-326.

Refereed Conference Proceedings (Not otherwise published in Journals)

46. Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2015). "How Do Data Skills Affect Firm Productivity: Evidence from Process-driven vs. Innovation-driven Practices," *Proceedings of the 34th Annual International Conference on Information Systems*.
47. Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2015). "Data Skills and the Value of Social Media: Evidence from Large-Sample Firm Value Analysis," *Proceedings of the 34th Annual International Conference on Information Systems*. (Updated version: SSRN 2826115)
48. Hong, Yili, Chen, Pei-Yu, and Lorin M. Hitt (2012). "Measuring Product Type with Dynamics of Online Review Variance: Implications for Research and Practice," *Proceedings of the 31st Annual International Conference on Information Systems* (runner-up best paper award). (Updated version: SSRN 2422686) (Conditionally accepted, *Information Systems Research*, 2020)
49. Tambe, Sonny, Hitt, Lorin M. and Erik Brynjolfsson (2011) "The Price and Quantity of IT-Related Intangible Capital," *Proceedings of the 30th Annual International Conference on Information Systems*.
50. Gao, Gordon and Lorin M. Hitt (2003). "The Economics of Telecommuting: Theory and Evidence," *Proceedings of the 24th Annual International Conference on Information Systems*, Seattle, WA.
51. Chen, Pei-Yu and Lorin M. Hitt (2001) "Brand Awareness and Price Dispersion in Electronic Markets," *22nd Annual International Conference on Information Systems*, New Orleans, LA.
52. Gu, Bin and Lorin M. Hitt (2001) "Transactions Costs and Market Efficiency," *22nd Annual International Conference on Information Systems*, New Orleans, LA.

Other Publications

Chapters in Books

53. Chen, Pei-Yu and Lorin M. Hitt (2007). "Information Technology and Switching Costs," in T. Hendershott, ed., *Handbook of Information Systems Economics*.
54. Brynjolfsson, Erik and Lorin M. Hitt (2005) "Intangible but not Unmeasurable: Some Thoughts on the Measure and Magnitude of Intangible Assets," in Carol Corrado and Daniel Sichel, eds., *Measuring Capital in the New Economy*, University of Chicago Press (for NBER).
55. Brynjolfsson, Erik and Lorin M. Hitt (2005) "Intangible Assets and the Economic Impact of Computers," in William Dutton, Brian Kahin, Ramon O'Callaghan, and Andrew Wyckoff, eds., *Transforming Enterprise*, MIT Press.
56. Clemons, Eric K., Hitt, Lorin M. and David C. Croson (2001) "The Future of Retail Financial Services: Transparency, Bypass and Differential Pricing," Chapter 4 in *Tracking a Transformation: E-commerce and the Terms of Competition in Industries* (J. Zysman, ed.), Brookings Institution Press: 92-111.
57. Clemons, Eric K. and Lorin M. Hitt (2001) "Financial Services: Transparency, Differential Pricing and Disintermediation," Chapter 4 in *The Economic Payoff from the Internet Revolution* (R. Litan and A. Rivlin, eds.), Brookings Institution Press: 87-128.
58. Hitt, Lorin M., Frei, Frances X. and Patrick T. Harker. (1999) "How Financial Firms Decide on Technology," Chapter 3 in *Brookings/Wharton Papers on Financial Services:1999*, Litan, Robert E. and Anthony M. Santomero, Eds. Washington, DC: Brookings Institution Press: 93-136.
59. Hitt, Lorin M. (1999). "The Impact of IT Management Practices on the Performance of Life Insurance Companies," Chapter 7 in *Changes in the Life Insurance Industry: Efficiency, Technology and Risk Management* (J. David Cummins and Anthony M. Santomero, eds.), Norwell, MA: Kluwer Academic Publishers: 211-243.

Trade Journal Publications

60. Brynjolfsson, Erik and Lorin M. Hitt (1997) "Breaking Boundaries", *InformationWeek* 500 September 22: 54-61.
61. Brynjolfsson, Erik and Lorin M. Hitt (1996) "The Customer Counts," *InformationWeek*, September 8: 38-43.
62. Brynjolfsson, Erik and Lorin M. Hitt (1995) "The Productive Keep Producing," *InformationWeek*, September 18: 38-43.

Books

63. Ferguson, Matthew, Hitt, Lorin and Prasanna Tambe. *The Talent Equation*. McGraw Hill, 2013.

Reports

64. Ahluwalia, Simran, Caulfield, Matthew, Davidson, Leah, Diehl, Mary Margaret, Ipsas, Aline, Windle, Michael and Lorin M. Hitt (2017). *The Business of Voting*. Wharton Public Policy Issue Industry Report. (<https://publicpolicy.wharton.upenn.edu/business-of-voting/>)
65. Hitt, Lorin M. and Prasanna Tambe (2011). Technical Report: The Business Case for Healthcare Information Technology in Nursing Homes. White Paper (SSRN 1964841)

66. Beard, Nick, Elo, Kinga Z., Hitt, Lorin M. and Michael G. Housman (2007). The Economics of IT and Hospital Performance. Pricewaterhouse Coopers White Paper (http://www.pwc.com/us/en/technology-innovation-center/assets/healthindex_web-x.pdf)
67. Hitt, Lorin, Wu, Lynn, Campbell, Karen, Jeafarqomi, Karim, Ashtiani, Hamid and Leslie Levesque. "Corporate Data Literacy: Scoring Firms and Firm Performance," IHS Market White Paper, September 2018.

Working Papers

68. Yapar, Ozge, Lobel, Ruben and Lorin M. Hitt (2017). "Technology Sharing in Two Sided Markets." Working Paper.
69. Jin, Fujie, Wu, Andy and Lorin Hitt (2017). "Social is the New Financial: How Startup Social Media Activity Influences Funding Outcomes," Mack Center Working Paper, Wharton School (https://mackinstitute.wharton.upenn.edu/wp-content/uploads/2017/03/FP0331_WP_Feb2017.pdf)
70. Brynjolfsson, Erik, Hitt, Lorin M. and Heekyung Hellen Kim (2011). "Strength in Numbers: how Does Data-Driven Decisionmaking Affect Firm Performance?" Working Paper (SSRN 1919486)
71. Brynjolfsson, Erik, Hitt, Lorin M., Rock, Daniel and Prasanna Tambe (2020). "IT, AI and the Growth of Intangible Capital," Working Paper (SSRN 3416290) (in revision).
72. Erol, Etiye Cansu, Hitt, Lorin M. and Prasanna Tambe (2021). "Does EMR Adoption by Nursing Homes Decrease Hospitalization Costs?" Working Paper (SSRN 3725715).
73. Hitt, Lorin M., Jin, Fujie and Lynn Wu (2016). "Data Analytics Skills and the Corporate Value of Social Media," Working Paper (SSRN 2826115) (in revision).
74. Hong, Yili, Chen, Pei-Yu, Hitt, Lorin M. and Shin-yi Wu (2020). "Measuring Product Type and Purchase Uncertainty with Online Product Ratings: A Theoretical Model and Empirical Application," Working Paper (in review).
75. Wong, Xiaoning, Wu, Lynn and Lorin M. Hitt (2021). "Can Social Media Alleviate Inequality? Evidence from Venture Capital Financing," (in review).

Academic Honors

Management Science, Information Systems Best Paper Award Finalist (2014, 2015, winner 2016)
 Information Systems Research: Best Paper Award (2013)
 Wharton Excellence in Teaching Award, Undergraduate Division (1998, 1999, 2000, 2001, 2003, 2007, 2008, 2012, 2013, 2018, 2019, 2020)
 Best Paper in Information Systems and Economics (last 7 years), Workshop on Information Systems and Economics (1999)
 Runner-up for Best Paper, International Conference on Information Systems (1999, 2004, 2012)
 David Hauck Award for Distinguished Teaching, Wharton School (1999)
 Christian R. and Mary F. Lindback Award for Distinguished Teaching, University of Pennsylvania (1998)
 National Science Foundation CAREER Program Grant Recipient (1998)
 Best Paper Award, Management Information Systems Quarterly (1996)
 International Conference on Information Systems Doctoral Consortium (1995)
 MIT Industrial Performance Center Doctoral Dissertation Fellowship (1995)
 "Best Paper" and "Best Paper Addressing the Conference Theme" Awards at the International Conference on Information Systems (1994)
 DuWayne J. Petersen Fellowship (1992-1996)
 Honorable Mention, National Science Foundation Fellowship (1989)
 Elected to Tau Beta Pi Engineering Society (1988)

Elected to Sigma Xi Scientific Research Society (1988)
Finalist, National Merit Scholarship Program (1985)
National Society of Professional Engineers' Scholarship (1985)
Honorable Mention, Westinghouse Science Talent Search (1985)

Grants

Analytics at Wharton. AI's Effect on Innovation and Productivity. (\$50K) (12/20 – 12/22).

Commonwealth Fund. The Business Case for Healthcare IT in Nursing Homes. (~\$150K) (1/08 – 12/13).

Co-Principal Investigator (with Mei Xue and Patrick Harker), National Science Foundation. Collaborative Research: Customer Efficiency and the Management of Multi-Channel Service Delivery Systems. Award: ~\$250K (8/05 – 8/07)

Wharton eBusiness Initiative/Mack Center, University of Pennsylvania, Wharton School. Product Reviews, Pricing and Market Strategy. Award: \$10K (5/05-11/05)

Fishman Davidson Center, University of Pennsylvania, Wharton School. Information Technology, Product Variety and Operations (6/2004-6/2005). Award: ~\$18K.

University Research Foundation. Information Technology and Product Variety; Data Development and Analysis. Award: \$18.5K (9/2004-5/2005)

Co-Principal Investigator (with Paul Kleindorfer and D.J. Wu), SAP America. Valuation of ERP in the Oil and Gas Industry. Award: \$40K (10/02-6/03)

Principal Investigator, NSF Grant IRI-9733877 (Computing and Social Systems Program): The Economics of Information Technology, Organization and Productivity: Theory Development and Empirical Investigation. Award: \$309K (6/98-10/04)

Principal Investigator. Customer Behavior in On-Line Markets. Wharton Electronic Commerce Forum. Award: \$25K (6/00 – 6/01).

Principal Investigator. Switching Cost and Pricing in Electronic Markets. Wharton eBusiness Initiative. Award \$25K (6/01-6/02)

Journal/Conference Reviews

Editorial Board

Information Systems Research (Guest Senior Editor, 2009-2011; Senior Editor, 2007-2008; Associate Editor 2000-2002, 2004 Guest Associate Editor)
Journal of Management Information Systems (2002-present)
Management Science (2002-2008; Departmental Co-Editor – Information Systems, 2008-2015)
SSRN Information Systems and Economics (2004-2008)

Program Committee

Workshop on Information Systems and Economics (2009 Conference Co-Chair; 2004, Conference Co-Chair)
International Conference on Information Systems (2000, 2003 Associate Editor)

ACM Conference on Electronic Commerce (2007)

International Conference on Information Systems Doctoral Consortium (2007)

NYU CeDER Summer Doctoral Workshop (2007)

Ad-hoc Reviewer

American Economic Review, Canadian Journal of Economics, Canada Social Science Research and Humanities Council, City University of Hong Kong - Grant Review Committee, Communications of the ACM, Economic Inquiry, European Economic Review, European Journal of Operations Research, Hawaii International Conference on System Sciences Industrial Relations, Industrial and Labor Relations Review, Information Economics and Policy, Information Systems Frontiers, Information Systems Research, Information Technology and Management, Journal of Banking and Finance, Journal of Industrial Economics, Journal of Law, Economics and Organization, Journal of Management Information Systems, Journal of Organizational Computing, Journal of Productivity Analysis, Management Science, Managerial and Decision Economics, Manufacturing & Service Operations Management, Marketing Science, McGraw-Hill Textbook Division, MIS Quarterly (occasional Guest Associate Editor), National Science Foundation, Review of Economics and Statistics, Regional Science, Sloan Management Review, Quarterly Journal of Economics

Teaching Experience

Massachusetts Institute of Technology, Sloan School of Management. Course: 15.567 – Introduction to eBusiness, Fall, 2001 (2 sections, co-taught with Erik Brynjolfsson)

University of Pennsylvania, The Wharton School. Course: OPIM101 – Introduction to Operations and Information Management. Fall, 2007; Fall, 2008; Fall, 2009; Fall, 2010; Fall, 2011 (Co-instructor); Fall, 2012; Fall, 2013 (x2); Fall, 2014 (x2) ; Fall, 2015 (x2) (Instructor).

University of Pennsylvania, The Wharton School. Course: OPIM105 -- Data Analysis in VBA and SQL. Spring, 2011 (Co-instructor); Spring, 2012; Spring, 2013; Fall, 2013; Fall 2015; Fall 2016 x2; Fall 2017 x2; Fall 2018 x2, Fall 2019 x2; Spring 2020.

University of Pennsylvania, The Wharton School. Course: OPIM 469 - Advanced Topics in Information Strategy and Economics. Spring, 2000 (x2); Spring, 2001 (x2); Spring, 2002 (x3) (Instructor); Spring, 2003 (Co-instructor, 2 sections); Spring, 2004; Spring, 2005; Spring, 2006; Spring, 2007; Fall, 2008; Spring, 2010; Spring, 2011; Spring, 2012; Spring, 2013, Fall 2014 (Instructor)

University of Pennsylvania, The Wharton School. OPIM669 - Advanced Topics in Information Strategy/Financial Information Systems. Spring, 1998; Spring, 1999; Spring, 2000; Spring, 2001; Spring, 2002 (Guest Lecturer); Spring, 2003 (Co-instructor); Spring, 2004; Spring, 2005; Spring, 2006; Spring, 2007 (Instructor).

University of Pennsylvania, The Wharton School. Tiger Team Field Application Project. Spring, 1999; Spring, 2000; Spring, 2001 (Faculty Advisor for Electronic Commerce/IT projects)

University of Pennsylvania, The Wharton School. Course: EMTM900 – Electronic Commerce Marketing. Spring, 2000 (Guest Lecturer)

University of Pennsylvania, The Wharton School. Course: D-SEM on Electronic Commerce. Fall, 2000

University of Pennsylvania, The Wharton School. Course: OPIM 319 - Advanced Topics in Information Strategy/Advanced Decision Support Systems (now OPIM469). Spring, 1998; Spring, 1999 (Instructor)

University of Pennsylvania, The Wharton School. Course: OPIM 210 - Management Information Systems. Fall, 1996; Spring, 1997; Fall, 1997; Spring, 1998; Spring 1999 (x2); Fall, 2002 (x2); Spring, 2004; Spring, 2006; Fall, 2006; Spring, 2007; Fall, 2007 (Instructor).

University of Pennsylvania, The Wharton School. MBA Pre-Term Exercise on Contract Negotiations for Information Technology Outsourcing. Fall, 1998; Fall, 1999 (with D. Croson and R. Croson)

University of Pennsylvania, The Wharton School. Course: OPIM 950/955/960/961 - Doctoral Seminar in Information Technology: Economics and Organization. Fall, 1997; Fall, 2000 w/ R. Aron as OPIM899; Fall, 2001 (Guest Lecturer); Fall, 2003 (Guest Lecturer); Spring, 2003; Fall, 2004 (Guest Lecturer); Spring, 2005; Spring, 2008; Spring, 2010; Spring, 2012; Spring 2013 (co-Instructor); Spring, 2015; Spring 2016; Spring 2017; Spring 2018; Spring 2019.

University of Pennsylvania, The Wharton School. Course: WH101 – Business and You. Spring, 2017, Fall 2017, Fall 2018, Fall 2019. (cotaught OIDD Session).

University of Pennsylvania, The Wharton School. Course: OPIM 666 - Information: Industry Structure and Competitive Strategy. Winter Quarter, 1997; Spring Quarter, 1997 (Instructor); Guest Lecturer (Fall Quarter, 1999; Fall Quarter, 2000).

Massachusetts Institute of Technology, Sloan School of Management. Course: 15.566 - Information Technology as an Integrating Force in Manufacturing. Spring, 1995 (Teaching Assistant)

Brown University, Department of Engineering. Course: EN 162- Analog Circuit Design. Spring, 1987 (Teaching Assistant)

Professional Affiliations

Sigma Xi, Tau Beta Pi, Association for Computing Machinery, American Economic Association, INFORMS, Association for Information Systems

Students Supervised

Dissertation Supervisor

Eli Snir (2001): Lecturer, Washington University
Pei-Yu (Sharon) Chen (2002): Professor, Arizona State University
Guodong (Gordon) Gao (2005): Associate Professor, University of Maryland
Xinxin (Mandy) Li (2005): Associate Professor, University of Connecticut
Prasanna (Sonny) Tambe (2008): Associate Professor, Wharton School
Fujie Jin (2016): Assistant Professor, Indiana University

Thesis Reader

Bin Gu (2002): Professor, Arizona State University
Il-Horn Hann (2000): Professor, University of Maryland

Michael Jacobides (2000): Professor, London Business School
Jeff McCullough (2005): Assistant Professor, University of Minnesota
Ying Liu (2006): Assistant Professor, University of Hawaii
Ben Powell (2003): Unknown
Michael Row (2001): Private Industry
Baba Prasad (2003): Unknown
Mei Xue (2001): Associate Professor, Boston College
Matt Thatcher (1999): Assistant Professor, University of Nevada (Las Vegas)
Shinyi Wu (2003): Assistant Professor, Arizona State University
Moti Levi (2001): Private Industry
Antonio (Toni) Moreno-Garcia (2012): Assistant Professor, Northwestern University
Sergeui Roumanitsev (2006): Private Industry
Marcelo Olivares (2007): Associate Professor, Columbia University
Ben Shiller (2011): Assistant Professor, Brandeis University
Adam Saunders (2011): Assistant Professor, University of British Columbia
Fangyun (Tom) Tan (2011): Assistant Professor, Southern Methodist University
Vihbahshu Abhishek (2011): Assistant Professor, Carnegie Mellon University
Hessam Bavafa (2013): Assistant Professor, University of Wisconsin
Yili (Kevin) Hong (2013): Assistant Professor, Arizona State University
Dokyun Lee (2014): Assistant Professor, Carnegie Mellon University
Jing Peng (2015): Assistant Professor, University of Connecticut
Bowen Lou (2019): On academic job market

Other Doctoral Advising

Fujie Jin (2013): Summer Paper Advisor, Primary Academic Advisor
Amanda Jensen (2010): Summer Paper Advisor
Felipe Csaszar (2005): Academic Advisor
Ozge Yapar (2015-6): Independent study supervisor
Kayoung Choi (2015): Summer Paper Advisor
Atiye Cansu Erol (2019): Summer Paper Advisor

Masters Students

Xiaoge Zhou, OPIM Department, Wharton School (1999-2001): Thesis Supervisor
Jihae Wee, School of Engineering and Applied Science (2003): Project Supervisor
Zhu Lu, College of Arts and Sciences (2014): Thesis Supervisor

MBA Students

Anna Blaczyck, Wharton School (2004): Independent Study Project Supervisor
Luca Coltro, Wharton School (1997-1998): Advanced Study Project Supervisor
Andrew Trader, Wharton School (1999): Advanced Study Project Supervisor

Undergraduate Students

Steven Altman, Wharton School (1997): Independent Study Project Supervisor
Maury Apple, Wharton School (1997): Independent Study Project Supervisor
Tara Bhandari, Wharton School (2002): Society Project Supervisor
Thomas Burrell, Engineering School (2001): Senior Project Supervisor
Todd Bishop, Wharton School (1999): Independent Study Project Supervisor
Rachel Boim, Wharton School (1999): Independent Study Project Supervisor
Hope Bromley, Wharton School (2000): Independent Study Project Supervisor
John Chiang, Wharton School (2001): Society Project Supervisor
Charlene Chen, Wharton School (2005): Senior Design Project Supervisor

Robert Dolan, Wharton School (2003-4): Wharton Research Scholars Supervisor
Ronak Ghandhi, School of Engineering (2013): Senior Design Project Supervisor
Gabriel Gottlieb, School of Engineering (2002): Senior Design Project Supervisor
Phuong Ho, Department of Economics (1998): Honors Advisor
Richard Hooper, Systems Engineering (1999): Independent Study Project Advisor
Hunter Horsley, Wharton School (2015): Independent Study Project Advisor
Melinda Hu, Wharton School (2018-2019): Wharton Research Scholars Advisor
Pawel Hytry, Wharton School (2011-2012): Independent Study Project Advisor
Ulhas Jagdale, School of Engineering (2013): Senior Design Project Supervisor
Johnny Kong, Wharton School (2005): Senior Design Project Supervisor
Amin Laksmanni, Computer Science and Engineering (2010): Senior Design Supervisor
Henrique Laurino, Wharton School (2018): Senior Thesis Supervisor
Jacob Lefkowitz, Wharton School (1998): Society Project Supervisor
Steven Levick, Wharton School (2012): Independent Study Supervisor
Brandon Newberg, Wharton School (2012): Independent Study Supervisor
David Perez y Perez, Wharton School (1999): Independent Study Supervisor
Nickhil Ramchandi, Wharton School (1999): Independent Study Supervisor
Reuben Randolph, School of Engineering (1998): Project Supervisor
Kevin Reeves, School of Engineering (2001): Independent Study Project Supervisor
Allison Rosen, Wharton School (1997): Independent Study Project Supervisor
Jennifer Seo, School of Engineering (2000): Senior Design Project Supervisor
Kyle Smith, Wharton School (2001): Independent Study Project Supervisor
David Thornton, Wharton School (2005): Senior Design Project Supervisor
Jon Turow, Wharton School (2005-6): Independent Study Supervisor
Udack Victor, School of Engineering (2000): Senior Design Project Supervisor
Jason Wang, Wharton School (1998): Society Project Supervisor
Melinda Wang, Wharton School (2018): Senior Project Supervisor
Christine Wong, Wharton School (1997): Society Project Supervisor

Other Service

University of Pennsylvania

Academic Dishonesty Disciplinary Committee Panel (2012)
Trustees Committee on Academic Policy (2009-2010)
Lindback Teaching Award Committee (1999)

Wharton School

Curriculum Innovation and Review Committee (CIRC) (chair, 2016-20)
Undergraduate Curriculum Evaluation Committee (2014-2016)
Management Department Q-Review Committee, Chair (2013-2014)
Wharton Personnel Committee (2009-2011)
Dean's Advisory Group (2008)
Panel Moderator, Wharton Asia Business Forum (2006)
Undergraduate Curriculum Design Committee (2003)
Ph.D Program Review Committee (2000)
Dean's Council on Education (2001)
WebI Curriculum Development Committee (2000)

Wharton School, Undergraduate Division

Moderator, Wharton Information Technology Career Panel (1997-99)
Graduation Speaker (1999)
Parents Weekend Speaker (1999)
Hauck Teaching Award Committee (2000-01)

- Electronic Commerce Concentration Advisor (2000-present)
- Wharton/Monitor Corporation Undergraduate Case Competition Judge (2001)
- Deans Award for Excellence Committee (2010, 2006)
- Wharton School, Department of Operations and Information Management/OIDD
 - Recruiting Committee (2005, 2006, 2011, 2014, 2016)
 - Doctoral Admissions Committee (2004, 2005, 2011, 2012-13, 2015-7)
 - Department Q-Review Committee (1999-00)
 - Undergraduate Coordinator (1998-01, 2002-2008)
 - Undergraduate Curriculum Committee (1998-01, 2002-2008)
 - Department Computing Coordinator (1997)
 - Department Representative to Wharton Computing (1997)
 - Department Seminar Coordinator (1996, 2010)
 - Departmental Tenure Committees (2006, 2013, 2014, 2019)
- Wharton School, Public Policy Initiative
 - Wharton/OSET Foundation Project on the Voting Technology Industry (2016)
- Morgan State University
 - Advising on Curriculum Design (2019).
- MIT Center for Coordination Science
 - Seminar Coordinator (1994)
- National Science Foundation
 - Panelist (1998, 2001, 2003, 2005, 2006, 2015)
 - Participant in the NSF CISE/SBE Cyberinfrastructure Workshop (2005)
- International Conference on Information Systems
 - Doctoral Consortium Faculty (2006)
- Other
 - MIT Inclusive Innovation Competition Judge (2016)
 - NYU/CeDER Summer Doctoral Consortium Faculty (2006)

Appendix B

Prior Testimony At Trial, Arbitration or Deposition in the Last Four Years

Stuart Mackinnon v. Volkswagen Canada Group, Inc., et. al. Ontario Superior Court of Justice
File No. CV-17-582746-00CP. February, 2021.

Andrea M. Williams et al. v. Apple Inc. United States District Court for the Northern District of
California, Case No. 5:19-cv-4700-LHK. February, 2021.

Damonie Earl et al. v. The Boeing Company, Southwest Co. United States District Court for the
Eastern District of Texas, Sherman Division, Case No. 4:19-cv-00507-ALM. January, 2021.

*Jennifer Song and Scott Werkin v. Champion Petfoods USA, Inc. and Champion Petfoods
LP.* United States District Court, District of Minnesota, Case No. 18-cv-03205-PJS-
KMM. December, 2020.

VLSI Technology, LLC v. Intel Corporation. United States District Court for the Eastern District
of Texas, Case No. 19-cv-00977-ADA. September, 2020.

Jason Counts et. al. v. General Motors Corporation. United States District Court, Eastern
District of Michigan, Case No. 1:16-cv-12541-TLL-PTM. July, 2020.

Jennifer Nemet et. al. v. Volkswagen Group of America et. al. United States District Court for
the Northern District of California, Case No. 3:17-cv-04372-CRB. July 2020.

In Re: Sonic Corp. Customer Data Breach Litigation. United States District Court for the
Northern District of Ohio (Eastern Division at Cleveland), Case No. 1:17-md-02807-JSG. April,
2020.

*Kimberley Laura Smith-Brown et. al. v. Ulta Beauty, Inc. and Ulta Salon, Cosmetics and
Fragrances, Inc.* United States District Court for the Northern District of Illinois, Eastern
Division, Case No. 1:18-cv-610. February, 2020.

*The California Institute of Technology v. Broadcom Limited, Broadcom Corporation, Avago
Technologies Limited, Apple, Inc. and Cypress Semiconductor Corporation.* United States
District Court for the Central District of California, Case No. 2:16-cv-3714-GW (AGRx).
January, 2020.

Scott Weaver v. Champion Petfoods USA, Inc. and Champion Petfoods LP. United States
District Court for the Central District of California, Western Division, Case No. 2:18-cv-01996-
JPS. September, 2019.

*Dolby Laboratories Licensing Corporation and Dolby Corporation AB v. Adobe Systems
Incorporated.* United States District Court for the Northern District of California, Oakland
Division, Case No. 3:18-cv-01553-YGR. July, 2019.

Anthony Shamrell et al. v. Apple Inc., Superior Court of the State of California County
of San Diego, Case No: 37-2013-00055830-CU-PL-CTL. May, 2016 and June, 2019.

Jennifer Reitman et. al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP. United States District Court for the Central District of California, Western Division, Case No. 2:18-cv-01736-DOC-JPR. May, 2019.

Riley Johannessohn, et al., v. Polaris Industries Inc. (class action), United States District Court District of Minnesota, Case No. 0:16-cv-03348-PJS-LIB. March, 2019.

Route1 Inc. v. Airwatch LLC., United States District Court for the District of Delaware, Case No. 17-331-KAJ. March, 2019.

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Appendix C

Materials Relied Upon by Lorin M. Hitt

Pleadings

Third Amended Class Action Complaint, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern District of Illinois, Eastern Division, Case No. 1:18-cv-06951, June 17, 2020

Plaintiffs' Motion for Class Certification, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern District of Illinois, Eastern Division, Case No. 1:18-cv-06951, February 24, 2021

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Rebuttal Expert Report of Lorin M. Hitt, with Appendices, *Jennifer Reitman, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Central District of California, Western Division, MDL Case No. 2:18-cv-01736-DOC-JPR, May 13, 2019

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Expert Report of Dr. Robert H. Poppenga DVM, PhD, DABVT, with Exhibits, *Afshin Zarinebaf, et al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court Northern District of Illinois, Eastern Division, Case No. 1:18-cv-06951, February 19, 2021

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